Commercial Fisheries Abstracts

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

C. F. T. R. I.
FISH TECHNOLOGY EXPERIMENT STATION
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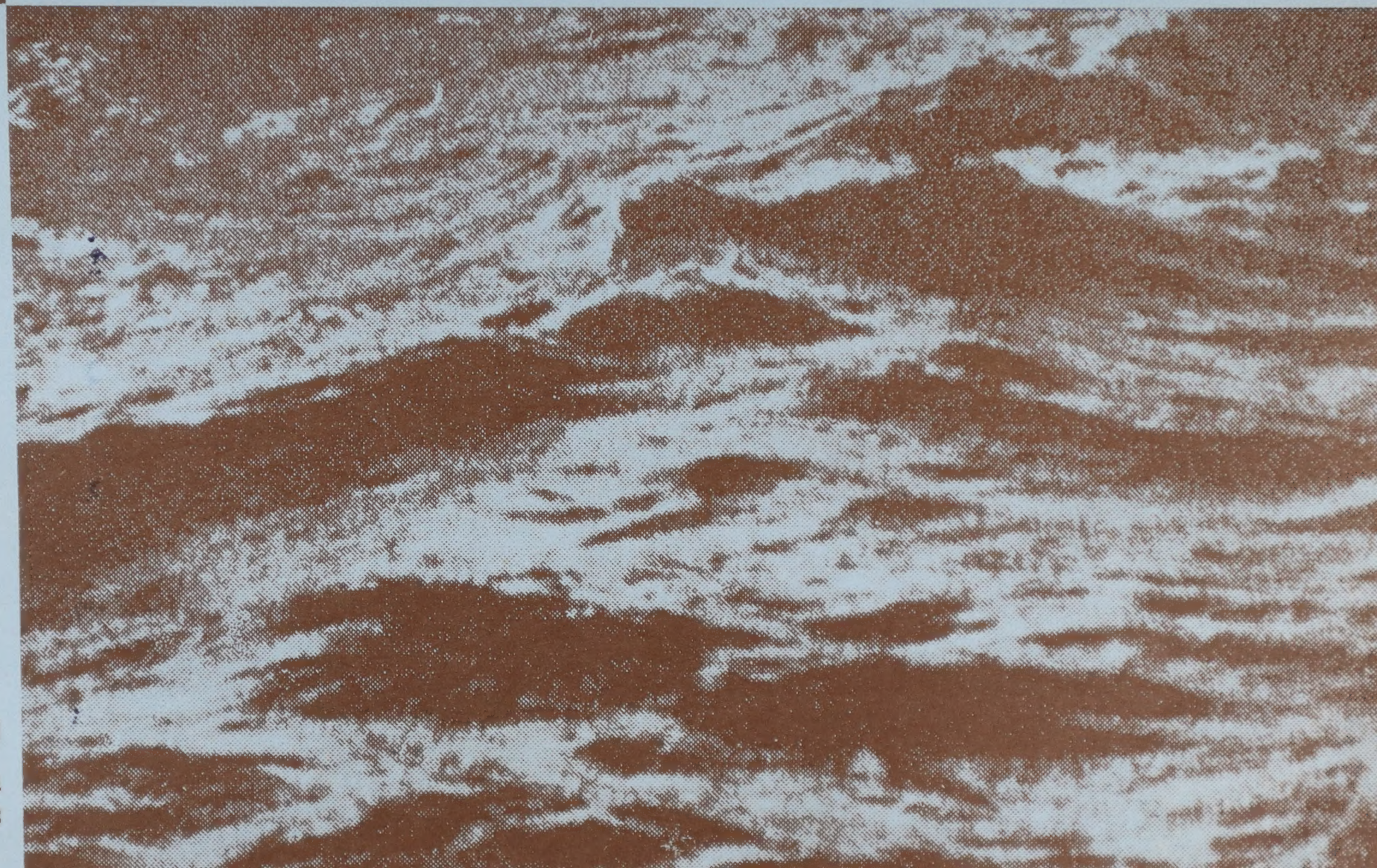

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UNITED STATES DEPARTMENT OF COMMERCE
Maurice H. Stans, *Secretary*

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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Philip M. Roedel, *Director*

FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.31 (4.2)

VOLATILE NEUTRAL COMPOUNDS FROM HEAT-DEGRADATED PORK FAT AND THEIR CONVERSION INTO LACTONES

Watanabe, Kenji, and Yasushi Sato (Laboratory of Food Science & Technology, Animal Products, Faculty of Agriculture, Nagoya University, Nagoya, Japan)
Agricultural and Biological Chemistry 34, No. 11, 1710-1715 (November 1970)

Earlier work [H. B. Craig, A. M. Pearson, and N. B. Webb, J. Food Sci. 27, 29 (1962)] has shown that uncooked pork fat has a characteristic fish odor that is influenced by the diet, age, and sex of the animal. Furthermore, heating brings out both the desirable and undesirable flavor components through degradation of the fat. Lactones appear to be one of the desirable flavor components of the volatile compounds of heated pork fat. The lactones are derived from the hydroxy acids in the pork fat and from the thermal oxidation of certain of the saturated fatty acids, aldehydes, and alcohols. The purpose of this study was to identify the neutral components in the volatile compounds of heated pork fat and to demonstrate the formation of lactones through the secondary degradation of the neutral components.

The volatile compounds from heated (160°-170° C. for 3 hr.) pork fat consisted of 13 aldehydes, 2 ketones, 6 alcohols, and 7 hydrocarbons (n-hexane, n-heptane, n-octane, n-nonane, ethanol, n-pentanal, decane, n-hexanal, n-undecane, 1-pentene-3-ol, n-heptanal, n-dodecane, n-pentanol, n-octanal, 2t-heptenal, n-hexanol, n-nonanal, 2-octenal, 1-octene-3-ol, n-decanal, 2-decanone, 2t-nonenal, n-octanol, n-undecanal, 2-undecanone, 2-decenal, n-dodecanal, 2-undecanal). Using undecane

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0.35 (9.19)

PROTEIN-DEFICIENT DIET AND DIURON TOXICITY

Boyd, Eldon M. (Department of Pharmacology, Queen's University, Kingston, Ontario, Canada), and Vincent Krupa
Journal of Agricultural and Food Chemistry 18, No. 6, 1104-1107 (November-December 1970)

This article reports on the clinicopathologic syndrome of toxicity to diuron [3-(3,4-dichlorophenyl)-1,1-dimethylurea] at the acute oral LD_{50} in male albino rats. The rats were fed for 28 days from weaning on diets containing 3.5% protein as casein (protein-deficient diet), and 26% casein or laboratory chow (normal protein diets). The basic objective of the study was to obtain information that would be useful in evaluating the safety of use of diuron in areas where the diet of the people is low in protein.

The LD_{50} + SE's for diuron, along with data for other pesticides, are shown in the following table. The syndrome of toxicity at the LD_{50} was the same in the rats of all three dietary groups and consisted of signs of depression of the central nervous system, cholinergic stimulation, a local gastroenteritis, hepatitis, nephritis, dehydration, and loss of weight in body organs.

[1 figure, 3 tables, 13 references]

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0.35 (9.19)

ESTROGENIC ACTIVITY OF DDT ANALOGS AND POLYCHLORINATED BIPHENYLS

Bitman, Joel (Animal Husbandry Research Division, Beltsville, Maryland 20705) and Helene C. Cecil
Journal of Agricultural and Food Chemistry 18, No. 6, 1108-1112 (November-December 1970)

U. V. Solmssen [Chem. Rev. 37, 481 (1945)] reviewed the synthetic estrogens, including the relation between their structure and their activity. In the meantime, DDT, a chlorinated hydrocarbon geometrically similar to the synthetic estrogens, has been widely used for pest control. Recently, researchers, including the authors and their coworkers, demonstrated the estrogenic activity of o,p'-DDT. The present study, then, was carried out to examine DDT analogs, homologs, and structurally related compounds to determine the relation of structure to estrogenic activity.

DDT and 52 related compounds were tested in a sensitive estrogen assay in rats [J. Bitman, H. J. Cecil, M. L. Mench, and T. R. Wrenn, Endocrinology 76, 63 (1965)]. The 18-hr. glycogen response of the uterus of the immature rat was used to evaluate estrogenic activity.

The researchers found that diphenylmethane, diphenylethane, and triphenylmethane compounds were active when a p- or p'-position was unoccupied or occupied by a hydroxy or methoxy group, but that halide or alkyl groups in these positions rendered the compounds inactive. Polychlorinated biphenyls and polychlorinated triphenyls showed estrogenic activity. Phenolphthalol and phenolphthalein were

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NATURAL α-RADIOACTIVITY CONCENTRATIONS IN BONE AND LIVER FROM VARIOUS ANIMAL SPECIES

Cherry, R. D., and M. M. Shay (Physics Department, University of Cape Town, Rondebosch, South Africa) and L. V. Shannon (Division of Sea Fisheries, Sea Point, Cape Town)
Nature 228, No. 5275, 1002-1003 (December 5, 1970)

Mayneord et al. (1960) determined the total α-activity in the bone ash from several animal species. The present authors report the preliminary results of a similar but more extensive determination. The α-radioactivity they found in the bones (cleaned, steamed, dried, and ground) and soft tissues (freeze-dried and ground) of various species is tabulated on the back of the card.

The authors speculate that the principal source of the variations shown in the table is the contribution that internally deposited α-emitting nuclides make to the natural radiation dose. In herbivore bones, the high activity levels can be attributed to concentrations of Ra-226 and -228 and to excess Po-210; in marine soft tissues, the high levels are due to excess Po-210 alone. The source of the Po-210 activity is probably the grass and the plankton these animals eat. Although the food eaten seems to be the main determinant of the α-radioactivity content of a species (note, for example, the similarity in the food eaten by men and pigs), such other factors as geographic location and metabolic mechanisms must be used to explain the concentrations of the α-emitters in biological tissues and bones.

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0.35 (9.19)

also estrogenically active (they contain the appropriate p, p'-dihydroxy structures). Apparently p, p'-dihydroxy compounds of the active nuclei would have internuclear distances of the hydroxyl groups which would approximate those of the natural steroidal estrogens and the synthetic stilbene estrogens.
[2 figures, 5 tables, 11 references] FTP

0.39

Animal species	Total α-activity in		Activity due to excess Po^{210} in		Soft tissue-to-bone total α-activity ratio
	Wet bone	Soft tissue	Wet bone	Soft tissue	
	pCi/kg.		percent		
Rock lobster	390*	14,800	--	84±6	38*
Marine fish	1,200	1,300	--	71±23	1.1
Seal	240	930	<15	96±2	3.9
Cattle	6,600	160	34±17	39±19	0.02
Dog	910	83	<15	<15	0.09
Pig	140	67	<15	<15	0.48
Man	240	26	<15	<15	0.11

* Shell rather than bone.

Spiers (1968) estimated that the natural radiation dose for human bone is about 150 mrem/yr.; of this, about 30% is the result of internally deposited α-emitters. The authors' data indicate that the total natural radiation dose for either herbivore bones or the soft tissues of marine animals exceeds 1,000 mrem/yr.; of this, 90% or more is the result of α-radiation.
[2 tables, 27 references] LB

0.31 (4.2)

as a representative of the hydrocarbons and 2t-decenal as a representative of the unsaturated aldehydes, the authors attempted to convert them by heat into lactones, but found that trace amounts of lactones were produced from the heated decane but not from the 2t-decenal. They concluded that the separated neutral compounds and undecane mixed with pork fat were converted into lactones.
[2 figures, 4 tables, 12 references] FTP

0.35 (9.19)

Pesticide	Rats fed protein-deficient diet of: 3.5% casein (Group I)		Rats fed normal protein diet of: 26% casein (Group II)		Laboratory chow (Group III)
	LD_{50} in mg./kg.±S.E.	LD_{50} ratio, II/I	LD_{50} in mg./kg.±S.E.	LD_{50} ratio, III/II	LD_{50} in mg./kg.±S.E.
Captan	480±110	26	12,600±2,100	1.0	12,500±3,500
Carbaryl	89±11	6	575±51	1.3	744±40
Chlordane	137±30	2	267±44	1.2	311±44
Chlorpropham	2,590±480	4	10,390±1,580	0.4	4,440±480
Demeton	2.13±0.37	4	7.62±0.22	1.4	10.40±0.77
Diazinon	215±26	2	415±39	1.1	466±87
Dicophane (DDT)	165±34	3	481±13	0.8	368±38
Dimethoate	147±29	1	152±22	2.4	358±9
Diuron	437±139	5	2,390±1,440	0.4	1,017±222
Endosulfan	24±10	4	102±16	1.2	121±16
Endrin	6.69±0.80	2	16.60±3.01	1.6	27.24±6.54
Lindane	95±33	2	184±16	0.9	157±37
Malathion	599±138	2	1,401±99	0.8	1,090±83
Monuron	950±240	3	2,880±310	0.5	1,480±310
Parathion	4.86±1.31	8	37.1±4.9	0.6	23.4±5.4
Toxaphene	80±19	4	293±31	0.8	220±33

Note: The acute oral LD_{50} of the pesticides in male albino rats fed for 28 days is expressed as mg./kg. ± standard error: the data are from publications cited by E.M. Boyd and F. I. Taylor [Toxicol Appl. Pharmacol., in press (1970)]. The LD ratio value is obtained by dividing the LD_{50}'s of the groups indicated. FTP

0.38 ON CHITINOLYTIC ACTIVITIES IN THE DIGESTIVE TRACTS OF SEVERAL SPECIES OF FISHES AND THE MASTICATION AND DIGESTION OF FOODS BY THEM

Yoshida, Yoichi, and Hiroshi Sera (Dept. Fish., Fac. Agr., Kyoto Univ., Maizuru, Japan) Bulletin of the Japanese Society of Scientific Fisheries 36, No. 8, 751-754 (August 1970) (In Japanese; summary and table in English)

Fish that feed on organisms with chitinous shells (such as shrimp and zooplankton) show chitinolytic activity in their stomachs--high levels at the cardiac part and in the blind sac, but comparatively low levels at the pyloric section. Species (Konosirus punctatus and Mugil cephalus) that feed mainly on phytoplankton or detritus and microbenthos showed in their stomachs low or negligible chitinolytic activity. [1 table, 8 references] FTP

0.35 JOURNAL OF BIOENERGETICS (9.6)

Vol. 1, Nos. 1-2. Published by Plenum:London, England (1970). Bimonthly. Price 210s; $26 per volume.
Avery, John (editor)
Reviewed by W. N. Aldridge
Nature 228, No. 5270, 481-482 (October 31, 1970)

The first two volumes of this new journal dealing with a specialized subject contained about 70% of their space devoted to experimental studies with mitochondria. The subject field of the journal is highly complex but the reviewer notes that the editorial and advisory boards show a wide range of expertise in a variety of disciplines. He hopes, therefore, that future issues will contain a better balance of papers, including information about the chemistry of the processes involved. FTP

0.39
(0.4)(1.89)
(6.38)

HAEMAGGLUTINATION AND HAEMAGGLUTINATION-INHIBITION REACTIONS OF EXTRACTS FROM SNAILS AND SPONGES. I. AGGLUTINATION OF HUMAN AND VARIOUS ANIMAL RED CELLS: ITS INHIBITION BY SUGARS AND AMINOSUGARS

Khalap, S., T. E. Thompson, and E. R. Gold (The Children's Hospital, St. Michael's Hill, Bristol 2, and Department of Zoology, University of Bristol, Bristol, England)
Vox Sanguinis 18, No. 6, 501-526 (June 1970)

A great number of substances, ranging in variety from cations of inorganic salts to animal and human antibodies, can cause hemagglutination. In 1965, Prokop et al. found a thermostable hemagglutin in the snail (Helix pomatia), and in 1968, Dodd et al. found hemagglutinins in marine sponges. Some of these substances exhibit ABO or MN specificity in agglutination-inhibition tests. Hopefully, therefore, the structure of many receptors for antibodylike hemagglutinins will soon be found, the authors say. To that end, they tried to learn something about the receptors on human and animal red cells with which extracts of three snails (Achatina granulata, Theba pisana, and Helicella virgata) and two sponges (Axinella sp. and Cliona celata) react.

Agglutination tests were run on native red cells (of group O, B, and A_1 human beings; and of cattle, horse, sheep, rat, goat, pig, dog, cat, guinea pig, rabbit, mouse, chicken, duck, tortoise, lamprey, clawed frog, and rainbow trout) and on red cells treated either with six different proteases or with pure, crystallized, synthetic neuraminidase. Then hemagglutination-inhibition tests were conducted with a panel of mono- and oligosaccharides, one polysaccharide, several glycoproteins and glycolipids, and various biological substances.

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0.4
(0.32) (1.93)

SEA SNAKE VENOM STRUCTURE PROBED

Anonymous
Chemical & Engineering News 49, No. 1, 25-26 (January 4, 1971)

Sea snakes abound in the coastal waters of Baja California, Mexico, Central America, South America, Southeast Asia, and East Africa and are among the most feared creatures that fishermen in these parts of the world encounter. Sea snake venom is more deadly than that of the rattlesnake--a single bite of the sea snake can bring death within hours.

Apparently the toxins of the sea snake venom are proteins. The structures of the toxic proteins of venom taken from various species from different areas are somewhat similar. In the report before the American Association for the Advancement of Science in Chicago, Anthony T. Tu (Colorado State University, Fort Collins, Colorado) stated that the simple chemical modification of the single tryptophan residue in a purified sea snake toxin detoxifies the toxin without appearing to affect its antigenicity. Modification of the toxin may make possible the more rapid production of antivenom of high potency.

In his study of the toxin of the venom from Laticauda semifasciata from the Philippine Islands, Tu found (by column chromatography) a fraction with an LD_{50} of 0.13 microgram per gram animal weight. The fraction consists of two active molecules (referred to as toxin a and toxin b) that differ only slightly from each other in their amino-acid content. Toxin a has 62 amino-acid residues, and toxin b, 61; both have a molecular weight of about 6,800. Both have arginine as the

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0.5

METHOD FOR ESTIMATING THE PRESENCE OF CLOSTRIDIUM PERFRINGENS IN FOOD

Harmon, S. M., and D. A. Kautter (Division of Microbiology, Food and Drug Administration, Washington, D.C. 20204)
Applied Microbiology 20, No. 6, 913-918 (December 1970)

Clostridium perfringens may cause illness (food poisoning) when large numbers of the viable organism are ingested. Because it does often occur in small numbers in certain foods, quantitative cultural methods are used to establish it as the causative agent of a food poisoning outbreak. However, the viability of the organism is rapidly lost when food samples are held refrigerated or frozen; about 1% of the vegetative cells will survive frozen storage for 48 hr. Earlier, the senior author suggested that the amount of alpha toxin could be used as an index of the growth of the organism in the food. This paper describes a method for estimating the presence of C. perfringens in food using the hemolytic and lecithinase activities of alpha toxin. Hemolytic activity was measured in hemolysin indicator plates; lecithinase activity of the extract was determined by the lecithovitellin test. Alpha toxin was extracted from food with 0.4 M saline buffered at pH 8.0 with 0.05 M N-2-hydroxyethylpiperazine-N'-2-ethanesulfonic acid and the sterilized extract was concentrated by dialysis against 30% polyethylene glycol. Thirty-two of thirty-four strains of C. perfringens associated with foodborne disease outbreaks produced sufficient alpha toxin in roast beef with gravy and in chicken broth to permit a reliable estimate of their growth in these foods.

A detectable quantity of alpha toxin was produced in food when the growth of C. perfringens exceeded 10^6 organisms per gram; the amount of toxin increased in

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0.5

ONE-DAY FLUORESCENT-ANTIBODY PROCEDURE FOR DETECTING SALMONELLAE IN FROZEN AND DRIED FOODS

Goepfert, J. M., M. E. Mann, and R. Hicks (Food Research Institute and Department of Microbiology, University of Wisconsin, Madison, Wisconsin 53706)
Applied Microbiology 20, No. 6, 977-983 (December 1970)

A method is needed for detecting salmonellae in foods that is rapid and simple and that has sensitivity and specificity equal to or greater than that of the present multistep cultural procedure (it requires from 3 to 7 days). The specific aim of this study was to develop such a method for the detection of salmonellae in dried and frozen food products that can be completed within 24 hr. and to employ reagents and media that are commercially available.

Four hundred and forty-two food samples were examined for the presence of salmonella by the indirect fluorescent-antibody technique. A cultural phase was used involving a 16-hr. preenrichment in buffered nutrient broth-milk medium followed by a 4- to 5-hr. subculture into fresh medium of the same composition. Sufficient populations of salmonellae were obtained by this procedure to yield no false-negative results. Thirty-one false-positives were obtained; 12 samples yielded positive cultural results upon extensive subculture of the original enrichment broths. Yeast cells, and the vegetative and spore forms of bacilli, also fluoresced when stained with anti-Salmonellae serum. Several possible causes for these cross-reactions were discussed. [1 figure, 1 table, 20 references] FTP

0.4 (0.32)(1.93)

N-terminal amino acid, and aspartic acid or asparagine the C-terminal one. Also, both have internal disulfide bridges at four locations.

Solutions of the toxins can withstand heating at 100° C. for 30 min. and exposure to pH of from 1 to 11 without any loss of toxicity.

A single tryptophan residue was found in toxins a and b of the venom of L. semifasciata; it appears to be a common feature of the toxins and is vital for the physiological activity of the molecules. Interaction of the toxin with N-bromosuccinimide completely detoxifies the toxin. Tu indicates that although the typtophan residue is essential for toxicity, it may not be essential for antigenicity of the molecule. FTP

0.4 (0.9) INTERNATIONAL RESEARCH: ITS ROLE IN ENVIRONMENTAL BIOLOGY

Higginson, John (International Agency for Research on Cancer, Lyon, France) Science 170, No. 3961, 935-939 (November 27, 1970)

The author contends that to determine the role of environmental factors in human health requires multidisciplinary investigations in several different populations, and that such research can be most effectively carried out at the international level. Furthermore, the logistic and political problems associated with such studies and the high cost of modern environmental biological investigations make it essential to avoid unnecessary duplication and waste of resources. An international research center could provide the human data necessary for calculating the balance between the benefit and harm of a given course of action and may,in addition, stimulate the long-term routine laboratory studies necessary as a basis for extrapolation from animals to man. [14 references] FTP

0.5 (9.19) BACTERIAL DEGRADATION OF DIPHENYLMETHANE, A DDT MODEL SUBSTRATE

Focht, D. D., and M. Alexander (Laboratory of Soil Microbiology, Department of Agronomy, Cornell University, Ithaca, N.Y. 14850)
Applied Microbiology 20, No. 4, 608-611 (October 1970)

The standard elective culture technique has certain drawbacks when used to demonstrate the microbial metabolism of persistent pesticides. The most critical drawback is that many bacteria can metabolize certain substrates but cannot utilize such substrates as the sole source of energy or of carbon for proliferation. This phenomenon is called "cometabolism." In this study, the researchers used the elective culture technique to obtain an organism that was able to grow on diphenylmethane (a nonchlorinated analogue of DDT) as the sole carbon source. A strain of Hydrogenomonas was isolated by the technique. The organism was a gram-negative, polar flagellated rod that hydrolyzes gelatin, gives positive reactions for catalase and cytochrome oxidase, and is negative in indole production, the methyl red test, and nitrate reduction.

Constitutive enzymes of the organism effected the oxidation and fission of one of the benzene rings of diphenylmethane; phenylacetic acid was a major degradation product. Also, small amounts of phenylglyoxylic acid and benzoic acid were generated. Phenylacetic acid (contains the second benzene ring of diphenylmethane) was metabolized by inducible enzymes (those enzymes that are not stored in inactive forms in the cell but are produced as needed).
[3 figures, 1 table, 11 references] FTP

0.39 (0.4)(1.89)(6.38)

The extracts that showed D-galactose specificity and were also inhibited by sugars either related to or containing D-galactose were of two kinds: (1) those with no blood-group specificity (Axinella sp., Cliona celata, and Ricinus communis [reported by Pardoe et al. in 1969]) and (2) those with B-like specificity (Helicella virgata, Bandeiraea simplicifolia [the phytagglutinins of which several authors have reported on], and Fomes fomentarius [reported on in 1960 by Gillespie et al.]). Extracts of the first kind were inhibited by Pn XIV polysaccharide; those of the second kind were not. Despite their anti-B-like specificity, extracts of this latter kind were inhibited just as well by NAcgal (N-acetyl-galactosamine) as by D-galactose--or even better. The extracts of Achatina and Theba lacked D-galactose specificity. The former was inhibited by NAcgal, N-acetyl-glucosamine, and NANA (N-acetylneuramininic acid); the latter only by NANA. Helicella extract agglutinated enzyme-treated B cells only, whereas Theba extract agglutinated neuraminidase-treated red cells only. [14 tables, 26 references] LB

1.013 (1.21)(1.123) RECENT DEVELOPMENTS IN PERUVIAN FISHERIES

Lander, Robert H. (Bureau of Commercial Fisheries Biological Laboratory, 2725 Montlake Blvd. East, Seattle, Washington 98102)
Commercial Fisheries Review 32, No. 10, 45-46 (October 1970)

In June 1970, I completed a 1-year tour with FAO at the Instituto del Mar del Peru, in Lima's seaport of Callao. I have selected for this article some recent, reportable general developments in Peruvian fisheries. From author's abstract [3 references]

0.5 CELL WALLS OF PSEUDOMONAS SPECIES SENSITIVE TO ETHYLENEDIAMINETETRAACETIC ACID

Wilkinson, S. G. (Department of Chemistry, University of Hull, Hull HU6 7RX, England)
Journal of Bacteriology 104, No. 3, 1035-1044 (December 1970)

The author describes the results of a broad, comparative study of the cell walls of 12 species of EDTA (ethylenediaminetetraacetic acid)-sensitive Pseudomonas organisms. The cell wall of each species contained protein, peptidoglycan, loosely bound lipid, and lipopolysaccharide. Tables of data on composition of the cell walls of the species are given for the general analyses (nitrogen, phosphorus, carbohydrate, 2-keto-3-deoxyoctonic acid, aldoheptose), amino acids, amino sugar (glucosamine, galactosamine, muramic acid, and six unknowns), ethanolamine, neutral sugar (galactose, glucose, mannose, fucose, ribose, rhamnose), crude lipid, ornithine, and fatty acids of the lipids. The results of these and possible additional studies on more strains could be useful in the classification of pseudomonads. [2 figures, 7 tables, 54 references] FTP

0.5 proportion to the cell population. The results indicate that a correlation can be made between the amount of alpha toxin present and previous growth of the organism in food regardless of whether the organisms are viable when the examination is made. [1 figure, 4 tables, 15 references] FTP

0.6 SYMPOSIUM ON SYNTHETICS AND SUBSTITUTES FOR THE FOOD INDUSTRY

Journal of Agricultural and Food Chemistry 18, No. 6, 961-1014 (November-December 1970)

Introduction by G. E. Inglett (Northern Regional Research Laboratory, U.S.D.A., Peoria, Illinois 61604) p. 961.

The author was the coordinator of the Symposium and indicated that the purpose of the Symposium was to review the recent advances in synthetics and substitutes applicable to the food industry. He defines synthetic substances as those prepared by synthesis (rather than natural growth) and substitutes as artificial products used to replace natural substances. The scope of the Symposium was limited to the chemical and physical properties of the materials.

"Cottonseed Protein Products--Composition and Functionality," by Wilda H. Martinez, Leah C. Berardi, and Leo A. Goldblatt (Southern Utilization Research and Development Division, Agricultural Research Service, U.S. Department of Agriculture, New Orleans, La. 70119), pp. 961-968. [9 figures, 5 tables, 30 references]

"Soybean Proteins: Their Functional, Chemical, and Physical Properties," by Walter J. Wolf (Northern Regional Research Laboratory, U.S. Department of Agriculture, Peoria, Ill. 61604), pp. 969-976. [5 figures, 7 tables, 65 references]

"Flavor and Flatulence Factors in Soybean Protein Products," by Joseph J. Rackis, David H. Honig, David J. Sessa (Northern Regional Research Laboratory, U.S. Department of Agriculture, Peoria, Ill. 61604) and Frederic R. Steggerda, pp. 977-982. [2 figures, 10 tables, 29 references]

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0.8 [CRYOGENICS] FOR STUDENT AND SPECIALIST
(0.113)(3.231)

Ricketson, Barrie (reviewer)
New Scientist 48, No. 731, 563-564 (December 24, 1970)

ADVANCES IN CRYOGENIC ENGINEERING, VOL. 15. K. D. Timmerhaus, editor; Plenum Press:London, England, 484 pp. $27.50.

This volume contains 60 papers presented at the 1969 Cryogenic Engineering Conference held at the University of California Los Angeles. Particularly large sections of the volume are devoted to heat transfer, thermodynamics, and fluid properties; liquefied natural gas and refrigeration systems are also well covered. The reviewer notes that the results of research and development in the space program are not as much in evidence in this volume as they have been in former volumes. He considers this annual series a must in the libraries of low-temperature laboratories and cryogenic engineering firms.

CRYOGENIC LABORATORY EQUIPMENT. A. J. Croft; Plenum Press:London, England, 182 pp. 108s.

For more than 20 years, the author of this book has been building hydrogen and helium liquefiers, with their associated gas-handling equipment, in the Clarendon Laboratory at Oxford. His design information and sketches, therefore, are of the practical nature a researcher needs to construct his own experimental apparatus. The book's first three chapters contain introductory material on refrigerants and their liquefaction, storage, and handling; the last six chapters contain the practical technical material. The book has adequate references, a

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0.8 BRIDGING THE ENVIRONMENTAL ABYSS.
(9.19) PART 3: WASTE TREATMENT PROCEDURES

Lachman, Robert I. (Food Science Department, Cornell University, Ithaca, N.Y.)
Canner/Packer 139, No. 12, 27-29 (November 1970)

The goal of the first annual Wastewater Engineering Conference was to improve communications between environmental engineers and food processors. In part 2 of his report on the conference [see Commercial Fisheries Abstracts 24, No. 1, p. 8], the author, who is chairman of the second conference (held in February), reviewed those reports that dealt with wastewater management. In part 3, he reviews the papers that dealt with the effectiveness and cost of various waste-treatment methods. He also appends a glossary of terms a person might encounter in reading about the treatment of wastes.

Fred Gurnham (Illinois Institute of Technology) explained how physical and chemical methods should be applied to waste treatment in the food industry, showing that although theoretically variables in waste cannot be controlled, they sometimes can be altered to improve the efficiency of the settling process. Because of the high volume of waste from food plants, freezing, dehydration, foam separation, ion exchange, electrodialysis, reverse osmosis, and ultrafiltration have little potential there. However, the last two could be useful in individual unit operations to reduce the pollution load. The polyelectrolyte method of thickening sludge is one of the few chemical methods that is economically feasible at present.

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1.01 THE FUTURE OF FISHING
(0.6)(9.16)
(9.17)(9.19)

Anonymous
Fishing News International 9, No. 11, 9-12, 14-15, 17-20 (November 1970)

Under the general title "The Future of Fishing," the journal has published extracts from three papers which, although given at three widely differing conferences, all concern the future of the world's fish supplies.

"Fish Can Help Meet Food Demand," pp. 10-12. At the 100th Anniversary Meeting of the American Fisheries Society, held in New York City September 13-16, Roy I. Jackson (Assistant Director-General (Fisheries) of the Food and Agriculture Organization) gave the keynote address: "Famine and the World Fisheries." He listed three urgent problems that fisheries scientists and administrators must solve--(1) effective management of the limited resources of traditional fisheries; (2) development of the resources of fisheries composed of less familiar species; and (3) extension of aquaculture, particularly if it involves species that feed directly on plant life. He considered each of these problems in the broad context of the food demands of a rapidly growing world population and of the broad and spreading blight of pollution. [3 photographs]

"Conservation and the Fish Catcher," pp. 14-17. Fisheries conservation was the theme of two papers given at the Symposium on Conservation, organized by the British Association for the Advancement of Science and held in Durham, England, early in September. In one, the authors (who work at the Marine Laboratory in Aberdeen, Scotland) gave the scientist's view of efforts to conserve the resources of the sea; his object is to ensure a satisfactory and profitable yield of

 (over)

0.8 (9.19)

Frank McKee (Kraftco Corporation) stressed the importance of employing a consultant trained in industrial waste-treatment procedures (rather than in sanitary engineering) during the selection, operation, and evaluation of any given biological treatment system.

R. R. Evans and R. S. Millward (Dorr-Oliver, Inc.) compared the cost (capital, chemical, sewer, and power), the space and manpower requirements, and the technical efficiency of gravity thickening, air flotation, and the Merco centrifuge as means of sludge disposal. They also compared the soil-conditioning, the sanitary-landfill, and the Fluosolids incineration methods of final sludge disposal. Despite its newness and the questionable life expectancy of the system, the technical operating advantages of the Fluosolids incineration method were considered impressive by conference participants.

In the session on cost-reduction techniques, Walter Rose (National Canners Laboratories, Berkeley, California) stressed the value of instilling in plant personnel the importance of reducing water usage. Five ways of reducing the volume or the strength of waste streams were discussed. Harold Jensen (General Foods Corporation) emphasized that such practices as those involving countercurrent flow, reduced water consumption, solids and oil removal, and quality control of raw products can but lead to cost reductions through product recovery and water utilization.

In the session on financing, James Boydston (Federal Water Quality Administration, Pacific Northwest Laboratory, 200 South 35th Street, Corvallis, Oregon 97330) outlined the various types of federal grants available to industries faced with specific water-pollution problems.

John H. Jenks (Jenks and Adamson) examined the advantages, disadvantages, and limitations of wastewater-treatment facilities shared jointly by the municipality and the food-processing industry. LB

1.01 (0.6)(9.16)(9.17)(9.19)

valuable food. In the other, Austen Laing, Director-General of the British Trawlers' Federation, gave the fisherman's view; his interest is purely economic and commercial. This interest does not necessarily conflict with those of the conservationist. However, the fisherman's conservationism is selective--he would have no objection to the extinction of all noncommercial fish that compete with or prey upon the fish he might catch and sell. Catching capacity (which can be expanded easily, but is not so easily contracted) and the aims of governments militate against conservation of fishery resources. Since governments can have very different and irreconcilable aims for their fishing industries (some countries may wish to have their industries held to the test of the market only; some may be concerned about problems of unemployment or the balance of payments or a protein shortage; some may simply use the fisheries as an opportunity for requesting foreign aid that could not be obtained in some other form; and some may be using the fisheries as part of a platform for launching their economies into higher growth rates), the pursuit of an economic optimum is misconceived. It is misconceived because it is totally unrealistic to expect governments, much less the fishermen themselves, to agree to reduce the fishing effort exerted in any important fishery to levels that will bring the total catch to a point below the maximum sustainable yield. [4 photographs]

"The Way Ahead for Marine Farms," pp. 18-20. At the Annual Congress of the British Veterinary Association, held at Warwick University, Coventry, on September 16, Ian Richardson (Research Secretary of the British White Fish Authority) said that marine fish farming will most certainly develop into an industry of significant size. However, it can do so only if veterinarians make a contribution similar to the one they made to animal and poultry husbandry. [3 photographs] LB

0.6

"Substitutes for Natural Flavors," by William J. Downey (Fritzsche Dodge & Olcott, Inc., 76 9th Avenue, New York, N.Y. 10011) and Robert J. Eiserle, pp. 983-987. [17 references]

"Synthetic Flavors for Fatty Foods," by Johann G. Keppler (Unilever Research Laboratories, Vlaardingen/Duiven, The Netherlands), pp. 988-991. [3 figures, 2 tables, 23 references]

"Physicochemical Methods for the Synthesis of Potential Foods," by Jacob Shapira (NASA-Ames Research Center, Moffett Field, Calif. 94035), pp. 992-996. [39 references]

"Modified Starches for the Food Industry," by O. B. Wurzburg and C. D. Szymanski (address correspondence to Szymanski)(National Starch & Chemical Corporation, 1700 West Front St., Plainfield, N.J. 07063), pp. 997-1001. [11 figures, 4 references]

"Low Calorie Lipids," by Helmut L. Merten (Monsanto Company, St. Louis, Mo. 63166), pp. 1002-1004. [4 tables, 41 references]

"Soy Products for the Meat Industry," by Joseph Rakosky, Jr. (Central Soya, 1825 N. Laramie Ave., Chicago, Ill. 60639), pp. 1005-1009. [1 figure, 1 table, 34 references]

"Synthetic Amino Acids and Their Use in Fortifying Foods," by Hans H. Ottenheym and Peter J. Jenneskens (Central Laboratory, DSM, P.O. Box 18, Geleen, The Netherlands), pp. 1010-1014. [7 figures, 5 tables, 9 references] FTP

0.8 (0.113)(3.231)

short bibliography, and a section giving the source of supply of the materials and equipment needed to build a low-temperature apparatus.

CRYOGENICS AND REFRIGERATION--A BIBLIOGRAPHICAL GUIDE--VOL. 2. E. M. Codlin; Macdonald:London, England, 263 pp. 140s.

Volume 1 of this bibliographical guide covers the development of low-temperature research and technology up to 1966; volume 2 covers the period from early 1966 to the end of 1968. In addition to the expected sections on refrigerators and superconductivity, it has sections on food processing and air conditioning. Each of the 1,800 references indicates how many references are cited in the original paper; each is accompanied by some 10 words or so describing the contents. An author and a subject index are included at the end of the book.

The reviewer notes that the British Cryogenics Council has proposed establishment of a Cryogenic Center that would, in collaboration with the National Bureau of Standards at Boulder, Colorado, become a reference and critical analysis point for low-temperature information. Until such a center is established, he adds, this bibliographical guide has value as the first step in any literature search. LB

0.12 (CONVEYOR) SANIVEYOR FOOD QUALITY BELTING

Anonymous
Pd Trade Rev. 40, No. 9, 42 (1970)
BFMIRA Abstracts 24, No. 1, Abstract No. 200, p. 42 (January 1971)

This belting, made in the U.S.A., may be used in wet and dry operations within a temperature range of -20° F to 225° F. It is made of tough polyester fibres.

M.R.A. Reprinted

1.0118 (9.17) THE SEA LAMPREY IN THE GREAT LAKES

Lawrie, A. H. (Fisheries Research Board of Canada, Freshwater Institute, 501 University Crescent, Winnipeg 19, Manitoba, Canada)
Transactions of the American Fisheries Society 99, No. 4, 766-781 (October 1970)

The sea lamprey was inadvertently introduced above Niagara Falls by the development of the Welland Canal between Lakes Ontario and Erie. A major population did not develop in Lake Erie but the species rapidly established itself as a highly significant predator in all three upper lakes. Its most obvious effect was the virtual extermination of the lake trout which had been the mainstay of the fishery. Efforts were made to limit sea lamprey reproduction by blocking the major spawning runs. These measures helped define the scope of the problem and generated considerable knowledge of the fluvial phase of the animal's life history but apparently exerted no significant restraint on population growth. Later control measures employed lamprey specific, selective toxicants to destroy larval populations in stream and estuarine habitats. Introduced first on Lake Superior to conserve the only significant lake trout stock then remaining, vigorous prosecution of these "treatments" resulted in a reduction, in 1961-62, of the Lake Superior adult sea lamprey population to a fifth or less of its maximum level. Since then the decline has continued though much less precipitously. A marked decrease in the proportion of males to females has accompanied the reduction in numbers. Similar changes in the sex ratio of spawning run Lake Michigan sea lamprey presumably reflect successful extension of control measures to that lake.

(over)

1.82 (1.0115) THE OCEAN QUAHOG, ARCTICA ISLANDICA, RESOURCE OF THE NORTHWESTERN ATLANTIC

Parker, Phillip S., and Ernest D. McRae, Jr. (Bureau of Commercial Fisheries, Fishery Exploratory Fishing and Gear Research Base, State Fish Pier, Gloucester, Massachusetts 01930)
Fishery Industrial Research 6, No. 4, 185-195 (November 1970)

The ocean quahog is also known by the common names "mahogany quahog" and "black quahog." This clam closely resembles the hard clam, but the two species are fairly easy to separate.

The ocean quahog occurs extensively along the Atlantic Seaboard north of Cape Hatteras. Incomplete information is available on the abundance and distribution of this clam; however, additional knowledge of its distribution and occurrence was gathered incidental to the surf clam survey by the Bureau of Commercial Fisheries between 1963 and 1967.

In the past, ocean quahogs have been commercially harvested in small quantities, and production reached a peak in 1944. The current production is about 500,000 pounds of meats annually. The potential U.S. sustainable yield of this resource is estimated conservatively as being about 100 million pounds of meats annually.

The total production from other clam resources is not expected to increase markedly in the future. The use of the ocean quahog resource offers a good possibility for filling future increases in the need for clams.

[5 figures, 4 tables, 7 references] Authors' summary

1.3 (2.1472)(9.2) PROBLEMS OF OVER-EXPANSION IN THE SALMON FLEET. PART ONE -- TROLLERS

Campbell, Blake A. (Economics Branch, Fisheries Service, Pacific Region)
Western Fisheries 81, No. 1, 14, 16, 18, 20-24 (October 1970)

The salmon-fishing fleets of British Columbia consist of three types of vessel: trollers, seiners, and gill-netters. At one time, the types were distinct, but in more recent years, combination vessels, particularly those equipped with both trolling and gill-netting gear, have appeared. This series of articles examines the development of each of these methods of harvesting salmon and speculates upon possible future trends.

Over the past 10 years, the value of the salmon troll fleet has increased more rapidly than has the value of the total fishing fleet. In addition, the upward trend in vessel values is more pronounced than is the increase in value of salmon production. Although the actual number of trollers has decreased (as a result of the Government's salmon-vessel license-control program), the value of the average vessel has increased, due to the following factors: (1) new vessel construction (between 1966 and 1969, new trollers or troller-combination vessels accounted for 46% by number and 40% by value of all new vessel construction); (2) inflation; (3) conversion of single-type vessels to combination trollers; (4) installation of improved freezing facilities; (5) change in power and size of the vessels; and (6) increased use of electronic aids. Each of these factors is examined.

(over)

1.85 (7.89)(3.2493) STUDIES ON THE KEEPING TIME IN RELATION TO QUALITY EVALUATION OF SHRIMP HELD IN REFRIGERATED BRINE AND ICE

Rojas García, Hugo F. (UNDP, INDERENA, FAO, Marine Fisheries Development Project in Colombia, Technological Laboratory, Bogotá, Colombia)
Comunicaciones 1, No. 1, 7 pp. (January 1970) (Biblioteca y Publicaciones, PRODEPESCA, Apartado, Aéreo No. 17798, Bogotá, Colombia)

The experiments herewith reported were designed to: (1) Obtain data on the keeping quality of headed shrimp held in (a) ice and (b) refrigerated brine at 29.7° F (-1.3° C), at sodium chloride concentration of 3%. (2) Ascertain the applicability of the phenol-red test papers Iyengar et al. (1960) for shrimp quality, (3) Evaluate the test as an index of shrimp quality by comparing it to organoleptic ratings at various stages of shrimp decomposition.

The data show that the keeping quality of the shrimp held in the refrigerated brine is superior to that of the shrimp stored in ice. An increase of 15 days in the keeping time of the shrimp held in the refrigerated brine was obtained.

During the progressive spoilage of shrimp the colour of the impregnated paper strips changes from deep yellow to deep pink. The colour shades for different quality grades are given in [a table]....

[1 figure, 2 tables, 8 references] Reprinted in part

1.3 (2.1472)(9.2)

During the past 20 years, the species composition of the troll salmon catch has changed decidedly. Before 1955, troll catches consisted primarily of coho and spring salmon; pinks and sockeye accounted for less than 4% of the total. Since then, the catch of pinks and sockeye has increased sharply and steadily; over the past 5 years, sockeye and pinks have made up more than 20% of the total. The author suggests that the production of troll-caught salmon, in terms of percentage of total catch, is approaching its peak.

Owners of many of the large trollers that have been built during the past 3 or 4 years will experience financial difficulties in the future, for returns from salmon production will not yield an adequate net income after high financing and operating costs are paid. Moreover, smaller, marginal producers who operate poorly equipped trollers will be forced out of the industry when regulations requiring improved fishing vessels are implemented. Therefore, the author suggests, the troll fisherman should analyze his projected net returns, taking all cost factors into consideration, before he increases his capital investment. Many fishermen who have increased their capitalization over the past 5 years have found that although their gross returns have increased, their net returns have declined. These fishermen have often overlooked two cost items that must be deducted from their gross return: the opportunity cost (that is, what their capital would earn if it were invested outside the fishery) and depreciation in line with allowable income tax rates. Because inflation has kept the value of old vessels at high levels, many fishermen have disregarded this depreciation allowance and have thus been living on their depreciation rather than their current earnings.
[1 chart, 10 tables] LB

1.86 (0.2) CARAPACE WIDTH-TOTAL WEIGHT RELATION OF BLUE CRABS FROM GALVESTON BAY, TEXAS

Pullen, Edward J., and W. Lee Trent (Bureau of Commercial Fisheries Biological Laboratory, Galveston, Texas 77550)
Transactions of the American Fisheries Society 99, No. 4, 795-798 (October 1970)

The blue crab, Callinectes sapidus Rathbun, is a valuable commercial species on the Gulf of Mexico and Atlantic coasts of the United States. About 109 million pounds valued at $10.8 million were harvested in the United States in 1968 (Lyles, 1969).

Extensive data on size of blue crabs are available from different localities, but they include either weight or carapace width (lateral distance between tips of longest cephalothorax spines)--not both. Equations are needed to convert carapace width to weight, or weight to width. These equations not only are useful in determining relative condition, growth, and size at sexual maturity of blue crabs, but also permit comparison of data from different localities.

Regression equations were developed between total weight (W) and carapace width (C) of blue crabs, Callinectes sapidus, taken from Galveston Bay, Texas. Male crabs (Log W = -3.74149 + 2.77478 Log C) were significantly heavier than females (Log W = -3.54147 + 2.63954 Log C) for a given carapace width.
[2 figures, 1 table, 5 references] Reprinted in part

1.0118 (9.17)

Treatment of lamprey infected Lake Huron tributaries is not yet complete. Further reductions in lamprey numbers can reasonably be expected to result from improving treatment techniques, but it is clear that total extermination is an unrealistic goal. It is not yet clear whether the present degree of control will permit restoration of self sustaining stocks of lake trout and other depleted prey populations. [4 figures, 3 tables, 28 references] Author's abstract

1.84 (1.0116) FLORIDA SCALLOP BEDS COULD SOLVE INDUSTRY'S SCARCITY PROBLEM

Anonymous
Quick Frozen Foods 33, No. 5, 259-261 (December 1970)

In 1960, over 11 million lb. of scallops, worth almost $6 million, was produced; in 1969, a little over 26 million lb. brought the producers over $39.5 million. Evidently the demand has outdistanced the supply--and the result is soaring prices. For this reason, the importance of the beds of calico scallops found off the Atlantic coast of Florida and North Carolina and in the eastern Gulf of Mexico cannot be overestimated. (See Commercial Fisheries Abstracts 22, No. 7, 5; 23, No. 6, 11, and No. 9, 13 for descriptions of the history and location of the beds, the processing vessels, and the processing equipment.) The implications to the frozen-seafood industry of the expected 15 million lb. these beds will yield by 1975 are noted. [3 photographs] LB

Hardy, E.
Canad. Packg. 40, No. 473, 6-7 (1970)
BFMIRA Abstracts 24, No. 1, Abstract No. 127, p. 27 (January 1971)

In this part of a continuing series the treatment of raw salmon before canning is briefly discussed together with methods for determining freshness and rancidity of fish muscle. The prevention of deterioration in smoke, pomfret and cod is briefly reviewed. L.P. Reprinted

Smith, Stanford H. (Bureau of Commercial Fisheries Great Lakes Fishery Laboratory, Ann Arbor, Michigan 48107)
Transactions of the American Fisheries Society 99, No. 4, 754-765 (October 1970)

The alewife (Alosa pseudoharengus) has caused serious problems in the Great Lakes for almost 100 years. It entered Lake Ontario in abundance via the Erie Canal during the 1860's when major piscivores were declining, and became the dominant species in the lake during the 1870's. The alewife subsequently spread throughout the Great Lakes and became the dominant species in Lakes Huron and Michigan as major piscivores declined. In lakes where it became extremely abundant, the shallow-water planktivores declined in the first decade after alewife establishment, the minor piscivores increased then declined in the second decade, and the deep-water planktivores declined in the third decade. The consequence has been a general reduction in fishery productivity. Rehabilitation will require extreme reduction of the alewife, and restoration of an interacting complex of deep- and shallow-water forage species, and minor and major piscivores, either by reestablishing species affected by the alewife, or by the introduction of new species that can thrive under the new ecological conditions of the lakes.
[3 tables, 62 references] Author's abstract

2.1111 WEATHERING OF PLASTICIZED POLY(VINYL CHLORIDE)

Dunn, P., D. Oldfield, and R. H. Stacewicz (Australian Defence Scientific Service, Department of Supply, Defence Standards Laboratories, Melbourne, Australia)
Journal of Applied Polymer Science 14, No. 8, 2107-2116 (August 1970)

Flexible polyvinylchloride (PVC) compositions, plasticized with one of 18 different organotin compounds and ultraviolet absorbers, were exposed for 4½ years at four climatically differing outdoor sites. Since changes in plasticizer content can have a marked effect on the mechanical properties of the PVC, loss of plasticizer by evaporation during exposure was measured and empirically correlated with the average daily maximum temperature at each test site. By measuring the viscosity of the PVC after exposure, the authors were able to estimate the relative effectiveness of each organotin compound and each UV absorber in preventing deterioration of the polymer. They compared the results obtained by this method of assessment with results of mechanical testa on the specimens. Some of the findings are tabulated on the back. [1 figure, 4 tables, 8 references]

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2.117 MATERIALS FOR THE SEA. PART 5. FERRO-SHOTCRETE: A PROMISING MATERIAL

Lachance, L. (Department of Civil Engineering, Laval University, Quebec City, Quebec, Canada)
Ocean Industry 5, No. 11, 60-62 (November 1970)

Ferro-shotcrete consists of several layers of small-diameter steel bars and wire fabrics covered with mortar that has been pneumatically projected at high velocity. The mortar is comparatively dry, and, since it is well compacted by the force of the jet, it can support itself without sagging even when applied overhead or vertically. The high percentage of steel makes for a very strong, relatively elastic, highly crack-resistant material. Ferro-shotcrete differs from reinforced concrete in its high percentage of steel reinforcement. The steel almost exclusively resists the stress forces and bending moments; the concrete serves mainly as a protective coating that makes the material waterproof.

Although ferro-concrete (or ferro-cement) has been used for several years, the difficulty of properly applying low-slump concrete with a trowel, coupled with the lack of basic research on techniques, has limited its use. The advent of the shotcreting technique, which permits easy, rapid application of high-quality concrete, has dictated a reassessment of the generally held view of this material. To that end, a few preliminary tests of the permeability of the material and its resistance to sea water were conducted.

A 3/4-in.-thick spherical dome was kept full of water for several weeks without exhibiting the slightest evidence of seepage or leakage. The dome was then

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2.1125 DOUBLE LEADLINE PURSE SEINES BOOST CATCHING POWER

Thorsteinsson, Gudni (Marine Research Institute, Reykjavik, Iceland)
South African Shipping News and Fishing Industry Review 25, No. 9, 70-72, 75, 77, 79 (September 1970)

The experimental purse seine described here differs from the usual commercial purse seines in three main areas:

1. The hanging ratio (the length of the line divided by the stretched length of the netting that is hung on it and multiplied by 100) is at least 10% more than the usual 65 or 70%. Therefore, a given area can be covered with less netting and the cost of the gear decreased; the netting meets less resistance in the water because the meshes are more open; and hauling the net through the power block is easier because the net doesn't form undesirable bags and tangles.

2. The length difference between the floatline and the lower leadline is small (only 30 cm. on a 1,000-mesh panel); thus the danger of tearing the net during shooting is reduced.

3. The net has two leadlines instead of one. The main purpose of this addition is to facilitate closing of the net during the pursing operation. As the lower leadline is hauled upward in the direction of the vessel, the netting is pulled horizontal between the two leadlines at an early stage of the pursing. The upper leadline acts as a hinge, holding the main netting vertical above the upper leadline. This division of the total weight of the lead between two leadlines reduces the risk of tearing the net during shooting and pursing.

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2.119 SECTION OF OCCUPATIONAL MEDICINE
(0.8)(3.231)
(2.2)(0.1)

Weiner, J. S., et al.
Proceedings of the Royal Society of Medicine 63, No. 10, 1003-1028 (October 1970)

At the Society's meeting on January 12, 1970, the chairmen (of the symposium titled Recent Developments in Personal Protective Clothing and Equipment) said that the conference had been planned so that recent advances in personal protection against hostile environments, both climatic and occupational, could be described and demonstrated. She noted the presence of members of the British Occupational Hygiene Society, who had been specially invited to the conference. Among the papers presented were the following:

"Introduction," J. S. Weiner (London School of Hygiene and Tropical Medicine Keppel Street, London WC1). Although a great many manufacturing firms are involved in the protective clothing industry, research, development, and systematic testing are on a small scale and are poorly coordinated. The scope of a research center established to remedy the conditions would embrace the search for improved clothing materials and designs; the testing and maintenance of protective equipment; the deliberate survey of situations, particularly specific industrial situations and jobs, in which better clothing is needed; and the establishment of an information and advisory service.

"Protective Clothing for Fishermen," Muriel L. Newhouse (TUC Centenary Institute of Occupational Health, London School of Hygiene and Tropical Medicine).

(over)

2.1129

Detailed instructions, with illustrations, are given for making this purse seine. Included are diagrams of sinking depth and sinking speed of the various panels. [10 figures, 1 table, 2 references] LB

2.1128 COLLAPSIBLE LOBSTER TRAP

Sexauer, Richard F. (140 Munsey Place, Manhasset, New York 11030) (pat.)
U.S. Patent 3,541,721 (November 24, 1970)

This collapsible lobster or fish trap has only a few separate parts, each of which can be stored flat; yet the trap can be assembled in a few minutes without any tools. It consists of a base ring; two upright, semicircular cage frames, whose ends are removably secured to the base ring and whose centers are removably joined together above the plane of the base ring; and a pivot-bar ring, which has a diameter less than that of the base ring and which rests on the cage frames in a plane parallel to but above that of the base ring. A number of latticelike gates hang side by side from the pivot ring, inside the base ring; they open inward only. The base of the trap is closed by a mesh material fastened to the base ring. The top of the trap is enclosed with a mesh material positioned domelike over the cage frames and removably secured to the pivot ring. LB

2.119 (0.8)(3.231)(2.2)(0.1)

The TUC Centenary Institute and the Medical Research Council's Environmental Physiology Unit, in cooperation with a clothing designer, a clothing manufacturer and various fishermen's organizations, are collaborating on a garment that will be light, warm, wet-proof, well-fitting, positively buoyant, reasonably priced and popular with the fishermen.

"Protective Clothing for Fishermen: Design Factors," Christopher R. Constable (Farr Ergonomics Ltd., 8 North Square, London NW11). Various materials and designs for trawler fishermen's work clothes have been investigated. The drawbacks of each are discussed in light of their need to prevent water from penetrating to the inner clothing and their requirement for buoyancy.

"Protective Clothing for Fishermen: Assessment of Design," G. W. Crockford (MRC Environmental Physiology Unit, London School of Hygiene and Tropical Medicine). The development of a test methodology suitable for use in industrial development laboratories was included in the design assessment program. Four of the tests are described and the results they yield when applied to various clothing designs are discussed.

"Articulated Suits: Principles and Design," C. B. Bolton (Ministry of Technology, Royal Aircraft Establishment, Engineering Physics Department, Farnborough, Hampshire). Articulation is particularly helpful in reducing the wearer's loss of mobility when he is dressed in clumsy garments designed to protect him against thermal extremes. The design of almost any garment can be improved by closer attention to engineering principles.

(Continued on Card B)

2.1111

Additive (0.5% w/w)	Inherent viscosity of PVC after 4.5 yr. of exposure at each site (X100)				Average viscosity	Overall rating
	hot-dry	hot-wet (open)	hot-wet ("jungle")	temperate		
S_1 + TBT fluoride	70.5	100.9	127.5	--	99.6	1
S_2 + TBT fluoride	68.9	97.1	116.0	--	94.0	2
S_1 + Ph_3SnF	70.7	105.4	98.0	89.2	90.8	3
S_1 + Poly(TBT methacrylate)	67.0	86.4	111.3	87.2	87.4	4
S_2 + Poly(TBT methacrylate)	75.7	78.7	97.4	94.3	86.5	6
Bis(TBT) sebacate	47.2	83.6	82.4	87.4	75.1	16
S_1	60.0	78.4	86.7	--	75.0	17
Poly(TBT methacrylate)	40.5	73.2	94.5	77.1	71.3	18
Control (no additive)	57.8	67.3	71.7	--	65.6	19

S_1 = 2-hydroxy-4-methoxybenzophenone
S_2 = 2-(2'-hydroxy-5-methylphenyl) benzotriazole
TBT= tri-n-butyltin
Ph_3SnF = triphenyltin fluoride LB

2.117

kept in a cold room (temperature -32° C.) for several days without being affected by the stresses of ice expansion. Further tests at room temperature showed that it was as waterproof as before.

The material cannot be used for oil reservoirs without being treated with a special protective coating. Tests on the 3/4-in. shell in which diesel oil rather than water was used showed that the material would become thoroughly impregnated with oil after only 24 hr.

Four ferro-shotcrete panels were tested for their resistance to sea water. Fixed to the side of a wharf at low tide in October 1969, they have been exposed to erosion by currents and waves, to wet and dry cycles, to freezing and thawing during spring and autumn, and to impact and erosion by ice blocks in winter. During this long-term investigation, the panels are being inspected at frequent intervals.

Because ferro-shotcrete is a new material, extensive fundamental research is needed to improve its properties. The types of reinforcement (plastic, fiberglass, or other kinds of wire, for example); special types of sand and cement, as well as their admixtures; dry-mix and wet-mix processes of shotcreting for optimum results in individual or specific applications; and such characteristics as permeability, durability, flexural strength, and corrosion and impact resistance must all be investigated thoroughly before the promising future of this material can be realized.

A step-by-step description of the construction of a ferro-shotcrete boat hull is given. [17 figures, 6 references] LB

2.119 SECTION OF OCCUPATIONAL MEDICINE
(0.8)(3.231)
(2.2)(0.1)

Card B

Weiner, J. S., et al.
Proceedings of the Royal Society of Medicine 63, No. 10, 1003-1028 (October 1970)

"Protection of Dockyard Workers Against Asbestos," P. G. Harries (Medical Research Unit, H. M. Dockyard (South), Devonport, PL1 4RU). Several types of full-face respirators are described. The problems associated with the wearing of impervious overalls can be overcome, the speaker said, "by issuing orange or lemon drinks as required, salt tablets, and an increased rate of pay for the discomfort of wearing the equipment."

"High Efficiency Personal Protection: Some New Materials and Methods," P. H. Schwabe (Chemical Defence Establishment, Porton Down, Salisbury, Wiltshire). A nonwoven fabric made of nylon and viscose fibers bonded with latex has been developed. The basic fabric is treated with a fluorochemical, which makes the garment liquid-repellent, and is spray-coated underneath with finely ground activated charcoal (bonded with latex), which adsorbs the vapor emanating from any liquid chemical that may drop on the surface of the garment.

Other papers dealt with disposable protective garments, decontamination methods for overalls of hide and wool handlers, radiation-protective clothing, a water-cooled suit for protection against hot environments, protective clothing for hot and cold hostile environments, protective clothing for underground workers, the development of weather-protective clothing for building site workers, and dynamic insulation (in which an equation relating airflow, assembly thickness, and conductance is given). [18 figures, 19 references] LB

2.1471 THE BEHAVIOR OF SOME FISH SPECIES IN A TRAWL

Korotkov, V. K. (Atlantic Research Institute for Sea Fisheries and Oceanography (AtlantNIRO), Kaliningrad, U.S.S.R.)
Problems of Ichthyology 9, No. 6, 893-899 (1969)

The author describes his visual observations, made from an underwater towed chamber (The "Atlant-1" bathyplane), of the behavior of some dozen-odd benthic and pelagic fishes in three parts of a bottom trawl being fished under natural conditions in the Gulf of Mexico. The three parts of the trawl observed were (1) the area between the wings and beneath the square, (2) the area between the square and the cod end, and (3) the cod end. The direction and the speed of the fish as they came out of the trawl were considered.

The fishes' visual perception of the trawl was the main factor governing their behavior. In the area of the arms, the square, and the first sections of the belly, fish don't try to escape through the webbing even if the mesh is large enough for them to do so. In front of the cod end and in its conical part, in contrast, fish use every small gap in the webbing and every sufficiently large mesh to escape. The reactions of scad (Decapterus punctatus Agassiz), sardine (Sardinella anchovia Valenciennes), common croaker (Haemulon plumieri Lacepede), white croaker (H. parra Desmarest), yellowfin croaker (H. flavolineatum Desmarest), porgies (fam. Sparidae), groupers (fam. Serranidae), flounder (Syacium micrurum Ranzani), skate (Dasyatis say Lesueur), surmullet (Mulloidichthys martinicus Cuvier), Spanish mackerel (Scomberomorus maculatus Mitchell), and barracuda (Sphyraena gauchancho Cuvier) were described in detail. [1 figure, 7 references] LB

2.12 (1.0119) REPORT ON A R/V CHOCO CRUISE TO PROVIDENCIA ISLAND AND ADJACENT BANKS OF QUITASUEÑO AND SERRANA NEAR THE CARIBBEAN ISLANDS OF COLOMBIA

Ben-Tuvia, Adam, and Campo E. Ríos
Comunicaciones 1, No. 2, 34 pp. + 1 p. (June 1970) (Biblioteca y Publicaciones, PRODEPESCA, Apartado, Aéreo No. 17798, Bogotá, Columbia)

A single cruise of the R/V Choco to San Andres and Providencia Islands and the nearby coral banks of Quitasueño and Serrana in August, 1969, gave information and results which allowed a preliminary estimation of the fishing potential of these areas. A catch of 12 kilos of spiny lobsters per fisherman per day was estimated from results of fishing by eight local fishermen on Quitasueno Bank, from which an annual yield of 190 metric tons of spiny lobsters is estimated. Also from information on present annual catches and observed daily catches of fishes of various species, an estimate of a total annual yield of 20,000 tons of fishes for the whole area was postulated. Relative abundance of commercial fish species is discussed. [9 figures, 9 tables, 4 references] Authors' abstract

2.2 (0.8) SYNCROLIFT DRY DOCK SYSTEMS FOR S.A. FISH HARBOURS

Anonymous
South African Shipping News and Fishing Industry Review 25, No. 9, 32-33, 35 (September 1970)

The Syncrolift is a vertical marine elevator comprising a platform, which is moved vertically by a series of electrically powered hoisting units; hoisting units, which are mounted on fixed concrete or steel structures on each side of the platform; hoisting unit motors, which are connected to a central push button control panel, all operating at the same speed irrespective of the load distribution on the platform; hoisting unit cables, which are corrosion resistant internally and externally and are considered the strongest available; and controls, which are equipped to brake all units automatically should the power fail.

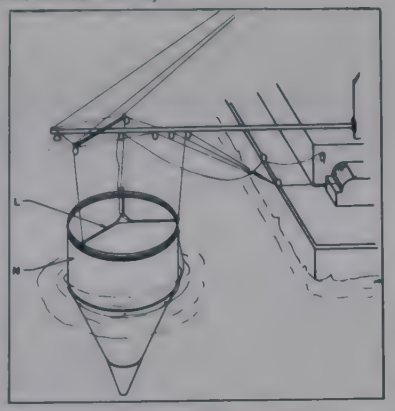
When a vessel is drydocked, the platform is lowered to a depth greater than the draft of the vessel, the vessel is floated over the submerged platform, and the platform is raised vertically till the vessel is above water level. Since the platform comes in multiple sections, each of which can be operated independently, a number of small vessels can be drydocked at different times--or, by operating the sections in unison, a large vessel can be docked. Additional sections and hoists can be added to increase the capacity of the system. The deck of the platform consists of timber planking on a steel frame. These planks can be easily lifted to clear areas needed for dropping long rudder shafts or other underwater equipment. With the system, a five-man docking crew can drydock a full-capacity

(over)

2.12 COLLECTING COASTAL PELAGIC FISHES WITH ARTIFICIAL LIGHT AND 5-METER LIFT NET

Wickham, Donald A. (National Marine Fisheries Service, Exploratory Fishing and Gear Research Base, P.O. Box 1207, Pascagoula, Mississippi 39567)
Commercial Fisheries Review 32, No. 12, 52-57 (December 1970)

The National Marine Fisheries Service (NMFS) Exploratory Fishing and Gear Research Base, Pascagoula, Mississippi, has used underwater lights and a large-diameter lift net to attract and capture live coastal pelagic fishes for experimental studies. The gear design and fishing methods evolved from our observations of the behavior of coastal pelagic fishes around underwater lights, and their responses to conventional lift nets. This article provides details for building and rigging the 5-meter (16.4 feet) diameter lift net--and the mounting platform used to position underwater lights and an echo sounder transducer over the net. The methods of fishing this gear and handling the live fish are described. [9 figures, 7 references] Author's abstract



Design and rigging for the 5-meter lift net (N) and the underwater lamp and echo-sounder transducer mounting platform (L).

2.12 PRELIMINARY RESULTS OF CRUISES 6901-6906 (1.85)(1.013) OF THE CHARTERED SHRIMPER "CACIQUE"

Squires, H. J., A. Ben-Tuvia, O. Mora L., O. Barona M., and O. Arroyo Q. Estudios e Investigaciones No. 2, 76 pp. (1970) (Biblioteca y Publicaciones, PRODEPESCA, Apartado Aéreo No. 17798, Bogotá, Colombia)

Six exploratory fishing cruises were made by a chartered shrimping vessel "Cacique" on the Pacific coastal shelf off Colombia during January to August 1969. These cruises have defined explicitly where commercial shrimping is done and the seasonal changes in abundance of the shrimp species. Also indicated are relative abundances of commercial, and non-commercial fishes, squids, jaiba crabs and spiny lobsters incidental to the shrimp catches. That fishing pressures have affected the abundance of demersal fishes was shown by lower catches of fishes in areas of commercial shrimp fishing. Preliminary indications of the fish species taken are included. Also included in this report is an account of of total landings of shrimps (Penaeus occidentalis) in the fishery and an interpretation of shrimp length frequencies to show the time of major recruitment. Hydrographic data showed a radical change of the water masses with season, particularly in the structure of the thermocline, which might affect the availability of the major commercial species of shrimp. [14 figures, 27 tables] Authors' abstract

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2.00 CHANGE OF COMPOSITION OF SHRIMP AND OTHER MARINE ANIMALS DURING PROCESSING

Pedraja, Rafael R. (Booth Fisheries, 2 N. Riverside Plaza, Chicago, Illinois 60606)
Food Technology 24, No. 12, 37-39, 42 (December 1970)

This paper is a review of the information on the change of composition that takes place in shrimp from the fresh to the spoiled state. [1 figure, 6 tables, 2 references] FTP

2.2 (0.8)

vessel in 30 min., for no retrimming is required and no high, unstable keel blocks need be built--the vessel can be secured with tackle or shores from the stable piers alongside the platform.

The system can be used not only for repair and maintenance of vessels but for launching new vessels, constructing caissons, and raising barges onto barge carriers. The system also has a rail-transport extension system that can be installed on the platform. [4 figures] BT

2.1475 METHOD OF DIRECTING FISH SEINING OPERATIONS

Grayson, Wilbur Charles (3315 Twelfth Street, Port Arthur, Texas 77640) (pat.)
U.S. Patent 3,541,717 (November 24, 1970)

For fish-seining operations, both a search boat and a purse seiner are used. Both are radio equipped. The search boat has an electrically operated sonar unit consisting of a viewing unit and a submerged transducer; the seiner has an electrically operated transponder unit. The position of the fish located by the search boat is displayed on the viewing unit, as is the position of the seiner relative to the fish. The search boat directs by radio the fishing operations of the seiner. LB

2.3 APPARATUS FOR DRESSING FISH

Heck, Howard F. (107 W. 7th Street, Lawrence, Kansas 66044)(pat.)
U.S. Patent 3,546,738 (December 15, 1970)

Fresh fish are killed when an operator holds their heads to the terminals of an electric device; this method of killing moves the blood to the head. He then moves the fish to a block, where rotating cutter blades decapitate them, and then onto an endless conveyor, which runs along a processing path. Fingers spaced along the conveyor hold the fish as they are slit open longitudinally; spreader rails keep the carcasses open as they pass over a series of spoonlike scoops that are specially structured and arranged to remove all the entrails. With spreader rails disengaged, the fish are then conveyed through a liquid bath (of water, brine, or the like kept at 160°±10° F. for from 15 to 30 sec.--just enough to heat the skin but not the flesh) to a skinning section. There the spreaders are again engaged. As the spread-eagle fish are conveyed through the skinning section, jet streams of liquid are sprayed on an angle at a pressure of 700±100 p.s.i. against the approaching carcasses, peeling the skin but leaving the fatty subcutaneous layer. This fatty layer protects the fish flesh during subsequent freezing, merchandizing, and culinary preparation; it will disintegrate during cooking. Finally the dressed fish are released from the conveyor and delivered to an inspection table. LB

2.3 APPARATUS FOR PEELING SHRIMP

U.S. Patent Reissue 26,971 (Original No. 3,383,734)
Lapeyre, James M.; Laitram Corporation, New Orleans, La.) (pat.)

The apparatus is designed to peel either raw or precooked shrimp and represents an improvement over the earlier patent issued in 1967. FTP

2.3 MACHINE SEPARATION OF EDIBLE FLESH FROM FISH

Miyauchi, David, and Maynard Steinberg (Bureau of Commercial Fisheries Technology Laboratory, 2725 Montlake Blvd., East, Seattle, Washington 98102)
Fishery Industrial Research 6, No. 4, 165-171 (November 1970)

This paper gives the results of experiments in which the "Miny" Fish Separator was used on various species of fish and on small pink shrimp. The flesh separator works by squeezing the flesh from the skin and bones of fish and passing the flesh through the perforations on a stainless-steel drum. The separated skin and bones pass through a discharge chute. In the laboratory scale model used in these tests, the drum (about 8½ inches in length and 6½ inches in diameter) was perforated with closely spaced holes of 1/8-inch in diameter. Headed fish, gutted fish, filleting waste and trimmings, and whole shrimp were used.

The yield of minced flesh from nine different species of Pacific Ocean fish ranged from 37 to 60%. The yield of minced flesh from the fillet waste (frames) (21.0% of whole fish) from rockfish was 10.7% (calculated on the basis of the weight of the whole fish); the skin and bones were 10.3% (by difference).

The whole shrimp used ranged in weight from 1.5 to 8 grams (average was 3 grams). The yield of flesh from the shrimp was 90% from raw shrimp and 85% from cooked shrimp. [2 figures, 3 tables] FTP

The apparatus separately aligns, heads, and uniformly positions fish for feeding to further fish processing machinery. FTP

U.S. Patent 3,514,811
West, Jeffery L. (Assignor to the United States of America) (pat.)

2.3 FISH ORIENTER

3.15 ELIMINATION OF HARMFUL ORGANISMS FROM FOOD AND FEED BY IRRADIATION

Report of a Panel Held in Zeist, Netherlands, 12-16 June 1967, 123 pp. (July 1968)
Copy of the report is available from the International Atomic Energy Agency, Vienna, Austria. Order No. STI/PUB-200, price $3.50.
Nuclear Science Abstracts 24, No. 17, 3438 (September 15, 1970)

Proceedings are presented of a panel organized by the Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture, held at Zeist, The Netherlands, from June 12 to 16, 1967. The meeting was attended by 16 experts from 8 countries and one international organization. Separate abstracts were prepared for 10 of the 12 papers presented. The topics include the elimination of Salmonella, the inactivation of viruses, the devitalization of parasites and the elimination of Clostridia by irradiation in different food and feed products. One paper was published elsewhere and the other dealt with tests for contamination in mixed-feed ingredients. (F.M.M.) Reprinted

3.15 RADIATION PRESERVATION OF FISH. II. TROUT

Ehlermann, D., and R. Muenzner
Z. Lebensm.-Untersuch. Forsch. 142, No. 1, 7-12 (1970) (In German)
Nuclear Science Abstracts 24, No. 13, 2541-2542 (July 15, 1970)

Whole rainbow trout (Trutta iridea W. Gibb.) from a nearby farm were gutted, immediately packed in plastic films impermeable to oxygen and water vapour, irradiated with 10 Mev. electrons, and stored under wet ice. Samples were examined for organoleptical, chemical and microbiological quality during five weeks. Shelf life of unirradiated controls was 15 days, a dose of 50 Krad prolonged shelf life to 21 days. Doses of 100 and 200 Krad caused a certain loss of the typical fine flavor of trout, without substantial further improvement of shelf life A dose of 400 Krad prevented spoilage for over 5 weeks but affected flavor markedly. In comparison with other fish species, trout is particularly sensitive to irradiation. The chances for practical application of the radiation process therefore appear less favorable in this case. (auth.) Reprinted

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Sulfurous acid is used. The treated fish is ground then heated to >60° C. to volatilize some of the sulfurous acid and to convert the residue to sulfate salts. FTP

British Patent 1,193,278
Levin, E. (pat.)
Food Technology 24, No. 12, 58 (December 1970)

3.12 FISH PRESERVATION

3.15 EFFECT OF IRRADIATION OF ANISAKIS LARVAE IN SALTED HERRING

Van Mameren, J., and H. Houwing (Inst. for Fishery Products TNO, IJmuiden, Netherlands)
From Panel on Elimination of Harmful Organisms from Food and Feed by Irradiation, Zeist, Netherlands, pp. 73-80 (1968).
Nuclear Science Abstracts 24, No. 17, 3442 (September 15, 1970)

Experiments to test the practicability of using irradiation to kill Anisakis marina larvae in lightly salted herring (Clupea harengus) are described. The lower salt concentration used since the Second World War for the preservation of gibbed herring is insufficient to kill the parasites that may be harmful to the consumer. The nematodes were subjected to irradiation, either in water or saline suspension, or pressed between salted herring fillets or in situ in salted gibbed herring. The results were disappointing. In aqueous suspensions, a salt concentration of 6% and a dose of 1.0 Mrad resulted in 100% mortality, but appreciable numbers survived (although many of these were inactive) at lower irradiation doses and at lower salt concentrations. It was noted that for doses of either 0 or 0.3 Mrad the greatest survival occurred in 3% salt solutions. In testing the effect of irradiation on parasites in the fish or placed between fillets the doses were limited, because of flavor and color changes, to 0.3 Mrad for salted-ripened herring, and 0.6 Mrad for 5-day-old lightly salted herring. Substantial numbers of nematodes survived these doses. (auth.) Reprinted

3.15 RADIATION PRESERVATION OF FISH. III. CARP

Ehlermann, D., and R. Muenzner (Bundesforschungsanstalt fuer Lebensmittelfrischhaltung, Karlsruhe, Ger.)
Z. Lebensm.-Untersuch. Forsch. 142, No. 1, 12-17 (1970) (In German)
Nuclear Science Abstracts 24, No. 13, 2542 (July 15, 1970)

Freshly slaughtered whole carp (Cyprinus carpio L.) were gutted, immediately packed in plastic film impermeable to oxygen and water vapor, irradiated with 10 Mev. electrons, and stored under wet ice. Samples were examined for sensorical, chemical and microbiological quality during 5 weeks. Shelf life of unirradiated controls was 15 days, a dose of 0.5 Mrad prolonged shelf life, to about 35 days. Lower doses caused correspondingly shorter shelf life, higher doses up to 1.5 Mrad only reduced bacterial counts further, but additional shelf life was not achieved; the optimal dose therefore was 0.5 Mrad. No negative effect of irradiation on flavor of carp was observed; some members of the taste panel consistently rated irradiated samples higher than the nonirradiated. In comparision with other freshwater species, the chances for practical application of the irradiation process to carp seem particularly favorable. (auth.) Reprinted

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3.15 PROSPECTS FOR THE ELIMINATION OF CLOSTRIDIUM BOTULINUM FROM FISH AND FISHERY PRODUCTS BY IRRADIATION

Hobbs, G. (Ministry of Tech., Aberdeen, Scotland)
From Panel on Elimination of Harmful Organisms from Food and Feed by Irradiation, Zeist, Netherlands, pp. 101-107. Copy of the report is available from the International Atomic Energy Agency, Vienna, Austria. Order No. STI/PUB-[illegible], price $3.50.
Nuclear Science Reports 24, No. 17, 3442 (September 15, 1970)

The occurrence of Clostridium botulinum in fish and fishery products and its resistance to irradiation is discussed. Different possible irradiation treatments such as radappertization, radurization and combined processes are considered. For Great Britain it is suggested that sea-frozen fish should be thawed, filleted, packaged and irradiated at 0.3 Mrads. This irradiation treatment would give a sufficient extension of the market life. To eliminate the botulism hazard a temperature of less than 5° C for storage and distribution is recommended. (auth.) Reprinted

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2.9 (1.86) TOXICITY OF A XANTHID CRAB, ZOSIMUS AENEUS, AND SEVERAL OTHER SPECIES IN THE PACIFIC

Konosu, Shoji, Tamao Noguchi, and Yoshiro Hashimoto (Laboratory of Marine Biochemistry, Faculty of Agriculture, University of Tokyo, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 7, 715-719 (July 1970)

Several species of crab suspected of being toxic were examined. Samples of crabs were collected from various locations in the Pacific area. The samples were prepared and the toxicity bioassay was carried out as described by Hashimoto et al. (1969).

Specimens of Zosimus aeneus from Ishigaki Island, Rangiroa, and Marcus Island were toxic to a varying degree; specimens from Espiritu Santo and American Samoa were not toxic. Specimens of Carpilius maculatus (Akamon-gani) and Carpilius convexus (Yumon-gani) from American Samoa and Rangiroa, of Eriphia sebana (Yafutsuan-gani) from Rangiora, of Ocypode ceratophthalma (Tsunome-gani) from Okinawa Island, and of Mictyris longicarpus (Minami-kometsuki-gani) from Amami-Oshima Island were not toxic. [1 figure, 3 tables, 7 references] FTP

3.15 CHRONIC ANIMAL FEEDING STUDIES ON RADIATION-PASTEURIZED CLAMS. CHICKEN [FEEDING] EXPERIMENTS

Fegley, Harry C., and Russell S. Edmonds (Affiliated Medical Enterprizes, Princeton, N.J.)
Final Report, Contract AT(30-1)-3573, 531 pp. (January 22, 1969) Available from the National Technical Information Services, Operations Division, Springfield, Va. 22151. Order No. TID-25288(Vol. 1), microfiche 95¢; hard copy price on request.
Nuclear Science Abstracts 24, No. 13, 2541 (July 15, 1970)

Clams were given 400,000 and 800,000 rad doses of ^{60}Co γ radiation and stored in a freezer. Before feeding to chickens they were ground in a meat grinder, cooked in a pressure cooker, and added to basic diet mixtures. Data were obtained for effects on egg production, embryo viability, weight, survival, hematology, and pathology. Results are presented in the form of tables. There was no evidence that either irradiated or unirradiated clams affected egg production, hatchability, fertility, embryo viability, incidence of anomalies, birth weights, 30 day weights, or 30 day survival weights. There was a reduced hemoglobin level in some test groups. The only significant histopathology was the finding of aggregated macrophages in the liver. (H.L.W.) Reprinted

3.15 RADIATION PRESERVATION OF FISHERY PRODUCTS. II. APPLICATION OF RADIATION PRESERVATION TO CURE SHRIMP, COMMON SQUID, AND LITTLE SQUID

Choe, Sang, Tai Wha Chung, and Hi-sang Kwak (Korea Inst. of Science and Tech., Seoul, Korea)
J. Korean Nucl. Soc. 1, 23-31 (September 1969)
Nuclear Science Abstracts 24, No. 20, 4129 (October 31, 1970)

Whole cure shrimp, eviscerated common squid, and little squid meats were γ-irradiated using varying doses up to one Mrad. Changes in quality were assessed by organoleptic, chemical (VRS and TMA-N), biochemical (hypoxanthine), and microbiological tests; and the effect of radiation on prolonging of the storage life at 2 to 4° C was studied. With the cure shrimp, 0.12 to 0.20 Mrad appeared to be optimal with 8 days of storage life, whereas the unirradiated control samples had a storage life of 3 days. With the common squid meat, 0.20 to 0.30 Mrad appeared to be optimal with 14 to 21 days of storage life, whereas the unirradiated control samples had a storage life of 8 days. And for the little squid meat, 0.12 to 0.20 Mrad appeared to be optimal with 10 days of storage, whereas the unirradiated control samples had a storage life of 5 to 6 days. (auth.) Reprinted

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Hastein, Tore (Veterinaerinst., Norway)
Chemical Abstracts 72, No. 23, 120378n (June 8, 1970)

3.18 DISINFECTION OF FISHING EQUIPMENT (2.112)

3.15 IRRADIATION OF PACKAGED ENGLISH SOLE FILLETS

Chung, Jong Rak (Korea Inst. of Science and Tech., Seoul, Korea)
J. Korean Nucl. Soc. 1, 17-22 (September 1969)
Nuclear Science Abstracts 24, No. 20, 4128-4129 (October 31, 1970)

English sole (Parophrys vetulus) fillets packaged in polymylar bags were irradiated at 500 Krad, using a ^{60}Co irradiator and the accumulation of spoilage indices substances and bacterial growth in the irradiated and unirradiated samples was measured during 36 days of storage at 0 to 2° C. A casein-agar plate technique was developed for a direct enumeration of proteolytic bacterial population, thus enabling the determination of relative proportion of proteolytic bacteria in the total microflora at each storage interval. Irradiation at 500 Krad resulted in a tenfold reduction of microflora and throughout the storage period the level of microflora lagged behind that of the unirradiated, by as much as one thousandfold. This was accompanied by a remarkable suppression of TVB and TMA accumulation in the irradiated samples, never reaching a spoilage level. Proteolytic bacterial population also was reduced to below 1% of the total viable count and remained so throughout the storage period, while proteolytic bacteria in the unirradiated samples increased proportionately with the storage, comprising 85.5% of the total microflora by the twenty-second day. This selective removal of proteolytic bacteria must account for the reduced rate of proteolysis that occurred in the irradiated samples during storage. (auth.) Reprinted

3.15 STUDY OF IRRADIATED-PASTEURIZED FISHERY PRODUCTS

Ronsivalli, L. J., F. J. King, V. G. Ampola, and J. A. Holston (Bureau of Commercial Fisheries, Technological Laboratory, Gloucester, Mass.)
Annual Report, Contract AT(49-11)-1889, 154 pp. (April 1970) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. TID-25312, microfiche 95¢; hard copy price on request.
Nuclear Science Abstracts 24, No. 17, 3439 (September 15, 1970)

Data are reviewed from an eight-year study that demonstrated the feasibility of using ionizing radiation for the processing of iced seafoods to extend refrigerated storage life. Studies were made on haddock, pollock, ocean perch, cod, mackerel fillets, clams, lobster, crab, scallops, and shrimp. Radiopasteurization was found to be practical for cod and haddock fillets iced for as long as seven to ten days prior to irradiation. The preserving effect of radiation was attributed to reduction in the number of bacteria. Irradiation at 250 kilorads caused a reduction of about 99% in the number of bacteria. Flexible plastic materials were found to be suitable for packaging fish prior to radiation processing. Data on the storage life of radiation processed seafoods stored at 40° F. are included. Results are also included from studies on the effects of γ radiation on the chemical composition of stored cod and haddock fillets. The greatest effect on the development of carbonyl compounds and changes in the free amino acid content and fatty acid composition was observed at doses ranging from 0.2 to 2.8 Mrad with the effect proportional to the radiation dose. (84 references) (C.H.) Reprinted

3.240 (2.15)(1.4) KEEPING TIME OF FROZEN REDFISH (SEBASTES MARINUS MENTELLA) FILLETS IN RELATION TO HANDLING OF THE RAW MATERIAL AND STORAGE TEMPERATURES AFTER PROCESSING AND FREEZING

Lauder, J. T., and W. A. MacCallum (Fisheries Research Board of Canada Technological Unit, St. John's, Newfoundland), and D. R. Idler (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 27, No. 9, 1589-1605 (September 1970)

This paper reports on a study of the effect of various periods of prefreezing storage (up to a maximum of 15 days) for iced, whole ocean perch (redfish) (Sebastes marinus mentella) on the subsequent keeping time of the frozen fillets stored at -23° C. and also the effect of storing the frozen fillets for various controlled periods at -23° C. and at higher temperatures. The ocean perch were caught on the Grand Bank and on Banquereau in May and June 1970. Assessments of the quality of the fish and fillets were made by a taste panel and by use of the chemical tests for protein solubility, rancidity, and pH.

Frozen fillets, prepared from ocean perch that had been iced for 2 days and then processed, had a storage life (to the unacceptable condition) at -23° C. of 83 to 94 weeks. Frozen fillets (prepared from ocean perch iced for 4 days and then processed) subjected to controlled variation in storage temperatures (-23° C.; -12° C.) during the initial frozen storage period and then stored at a final temperature of -18° C. (the type of conditions frozen fillets might experience aboard

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3.15 GENERAL INTRODUCTION TO RECENT DEVELOPMENTS IN FOOD PRESERVATION

Ingram, M. (Agricultural Research Council, Bristol, Eng.)
DeChema Monogr. 63, No. 1125-1143, 9-20 (1969) From 3rd European Symposium on Food: Modern Developments in Food Preservation, Bristol, England.
Nuclear Science Abstracts 24, No. 13, 2542 (July 15, 1970)

Advances in food preservation are mostly improvements in mechanical and engineering technology which, while they make big differences in control of quality and cost of production, do not represent really fundamental advances, the basic principles still being the traditional drying, salting, etc., aimed at control of micro-organisms. Where fundamental improvements on traditional processes have been made, it is most often in details concerned with control of the secondary enzymic and chemical changes. There are however a few processes which, though depending on long-established principles, are so much modified that they can no longer properly be called traditional. There were few developments in food preservation that were really revolutionary, in the sense that they created methods of food preservation resting on a principle entirely different from that of the traditional procedures. They have come from diverse sources, including radiation. (H.B.G.) Reprinted

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3.17 BIOCIDAL PRESERVATIVES FOR FISH

Gontchier, Beatrice, and Jacques Mocotte (pat.)
German Offen. (Patent) 1,921,670 (1970)
Chemical Abstracts 73, No. 9, 44115c (August 31, 1970)

3.240 (2.15)(1.4)

a refrigerated vessel or in cold storage) had initial quality characteristics similar to frozen fillets from fish iced for 12 days (then processed) and had a storage life (to unacceptability) of 44 weeks. Fillets from fish iced 15 days were not suitable for freezing.

The authors conclude that ocean perch should not be iced longer than 12 days and that the best frozen fillets are prepared from fish iced no longer than 2 days. [6 figures, 7 tables, 29 references, 1 appendix] ITI

[6 figures, 3 tables, 13 references] Author's abstract

The present Bulletin deals with the basic principles to follow in the sound practice of food canning. The first part discusses the influence of temperature and duration of heat treatment on the sterilization process, and the importance of a thorough understanding of the "absolute and practical" sterility concepts.

The second part deals with the principles and methods to follow in order to achieve a correct "retort operation." Norms concerning installation and handling of retorts are given, as well as the basis of the different processes described.

3.33 [PRINCIPIOS BÁSICOS DE LA ESTERILIZACION Y FUNCIONAMIENTO E INSTALACION DE AUTOCLAVES
[BASIC PRINCIPLES OF STERILIZATION AND OPERATION AND INSTALLATION OF AUTOCLAVES]

Rojas G., Hugo F.
Estudios e Investigaciones No. 3, 30 pp. (1970) (In Spanish; English abstract)
(Biblioteca y Publicaciones, PRODEPESCA, Apartado Aéreo No. 17798, Bogotá, Colombia)

3.15 NEW WAYS OF KEEPING FISH FRESH

Anonymous
Int. At. Energy Agency Bull. 12, No. 1, 18-20 (1970)
Nuclear Science Abstracts 24, No. 16, 3198 (August 31, 1970)

A brief discussion is presented of the effects of radiation processing on storage life of seafood. A report from the Icelandic Fisheries Laboratories on the advantages of irradiated cod, lobster, and shrimp is discussed. Economic advantages of radiation processing of fish and shrimp in India are pointed out. Studies in the United States showed that radiation processing could bring many benefits to the food industry. (H.L.W.) Reprinted

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3.15 RADIATION-PASTEURIZATION OF SUDDENLY BOILED SHRIMP

Hwang, Yin-si, Huan-wen Hsu, and Chaotung Sun (Provincial Coll. of Marine and Oceanic Tech., Keelung, China)
Hoken Butsuri 5, 25-27 (March 1970) (In Japanese)
Nuclear Science Abstracts 24, No. 18, 3638 (September 30, 1970)

The fresh shrimps (Erythropenaous akayebi var. sp.) were blanched three minutes in boiling 2% NaCl solution and then were sealed in polyethylene bags. The quickly boiled shrimps were irradiated by ^{60}Co and were preserved in the storage space of a refrigerator (3 to 5° C). The storage life of 0.6 megarad irradiated shrimps was extended to about 7 weeks, compared with 3 weeks for the unirradiated samples held at the same temperature. (auth.) Reprinted

3.15 STERILIZATION

Decareau, Robert V.
Microwave Power Engineering 2, 98-100. Published by Academic Press:New York (1968)
Nuclear Science Abstracts 24, No. 13, 2542 (July 15, 1970)

Results are reviewed from preliminary studies on the lethal effects of thermal radiation on Clostridium botulinum and yeasts. The possibilities of using microwave energy to reduce the processing time for foods in transparent containers are discussed. It is pointed out that the shorter processing time would improve product quality. Small containers can function as their own pressure cookers, but the internal pressure developed in larger glass containers would necessitate the use of a pressurized system and controlled cooling. The economic feasibility of using microwave energy in processing foods of various densities is discussed. (C.H.) Reprinted

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3.15 CURRENT TRENDS IN FISH HANDLING AND PROCESSING

Sidhu, G. S., and W. A. Montgomery (Commonwealth Scientific and Industrial Research Organization, Ryde, Australia)
Food Technol. Aust. 21, 642-645 (December 1969)
Nuclear Science Abstracts 24, No. 15, 2952 (August 15, 1970)

Irradiation pasteurization of fish is reviewed, with Australian applications considered. Radiation sterilization is compared with heat sterilization from a competitive viewpoint. (Australia) Reprinted

3.2495 (1.51) SOME OBSERVATIONS ON THE ULTRASTRUCTURE OF FROZEN STORED COD MUSCLE

Liljemark, A. (Swedish Institute for Food Preservation Research, Göteborg, Sweden)
Supplément au Bulletin de l'Institut International du Froid (Commissions IV & V, Budapest 1969, Annexe 1969-6), pp. 93-96

Although it is well known that fish muscle gradually becomes tougher and loses its water-holding capacity during frozen storage, the phenomenon has not been satisfactorily explained. During an investigation of these changes in the ultrastructure of the muscle of fresh-water cod, the author attempted to determine the correlation between toughening and the change in spacing of the myofilaments. Using unfrozen cod soon after the resolution of rigor mortis and thawed cod that had been stored for 3 years at -20° C. (and thus definitely tough), he prepared replicate cross sections of fibers by ultrathin sectioning and by freeze etching. The slight difference between unfrozen and frozen-stored samples, as revealed by electron micrographs, in no way correlated with the vast difference in the texture of the two types of samples. He concluded that the answer to the problem may lie within the filaments themselves, although the preparation technique may have obscured spacing differences. Improvements in electron microscopy may reveal differences in the internal organization of the filaments as well as interrelations, at the molecular level, between filaments.
[4 figures, 1 tables, 4 references] LB

3.3344 BLUEING OF PROCESSED CRAB MEAT. 1. A STUDY OF PROCESSING PROCEDURES THAT MAY CAUSE A BLUE DISCOLORATION IN PASTEURIZED CRAB MEAT

Waters, Melvin E. (Bureau of Commercial Fisheries Technological Laboratory, P.O. Drawer 1207, Pascagoula, Mississippi 39567)
Fishery Industrial Research 6, No. 4, 173-183 (November 1970)

Although the problem of blue discoloration of canned or pasteurized crab meat is not economically serious, it does come up sporadically and processors are anxious to avoid this problem. The nature of the phenomenon is not completely understood, but several explanations have been suggested and certain remedial treatments have been tried. In this study the author determined the effect, if any, on the blueing of pasteurized crab meat of (1) the processing temperature and time, (2) the freshness of the crab meat, and (3) the exposure of the crab meat to the metal of cans. Freshly picked meat of the blue crab, Callinectes sapidus, was used. The meats, packed in C-enamel cans, were heated at 170°, 180°, and 190° F. for varying lengths of time. [The crab meat reached 170° F. in about 20 min.; 180° F. in about 25 min.; and 190° F. in about 30 min.] The samples were stored at 38° F. The degree of development of blue discoloration was estimated visually. Bacteriological analyses were made to provide some insight as to the spoilage and public-health aspects of the temperature-time variations in the processing methods used.

Pasteurizing the meat at 170° F. for periods up to 30 minutes did not cause the meat to develop any discoloration throughout the period of storage. Pasteurizing the meat at 180° F., however, caused some blueing, the intensity of which

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3.330 (3.19) ELECTRICAL PROCESSING OF MARINE PRODUCTS

Otsuka, Shigeru (Toyonaka, Japan), and Hiromitsu Osada (Tarazuka, Japan); Toyo Seikan Kabushiki Kaisha, Tokyo (pat.)
U.S. Patent 3,547,657 (December 15, 1970)

Inorganic salts and organic bases of little or no nutritional value can cause the formation of struvite, off-colors, and off-odors in canned fish and shellfish, in fish sauce, and in dried marine products. Of these deleterious effects, the formation of struvite crystals has led to the greatest amount of consumer dissatisfaction, although the crystals themselves are harmless to the human body. A number of theories have been advanced to account for the formation of struvite (ammonium magnesium phosphate): the use of brine containing sea water or magnesium salts, the lapse of time between catching and canning, the manner and the season in which the fish are caught, pH values (of more than 6.3) of the packing fluid, the storage temperature of the canned fish, or thorough cooling of the fish following sterilization. A number of measures, also, have been suggested for preventing struvite formation. Most depend on the addition of such metal chelating agents as citric acid, phytic acid, pyrophosphoric acid or their salts to fix the magnesium. Although addition of these agents suppresses struvite formation considerably during the early periods of storage, the chelation effect is lost during long storage, possibly due to changes in the additive. Some additives may even function as an accelerator. In addition, since a considerable quantity of chelating agent must be added, the processor may find himself in violation of some country's regulations governing food additives.

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4.15 (5.7) (4.90) EFFECT OF FEEDING COD LIVER OIL ON THE FATE OF RADIOTOCOPHEROL IN SHEEP

Hidiroglou, M., K. J. Jenkins, J. R. Lessard, and E. Borowsky (Animal Research Institute, Research Branch, Canadian Department of Agriculture, Ottawa, Canada)
Canadian Journal of Physiology and Pharmacology 48, No. 11, 751-757 (November 1970)

Radiotocopherol has become a useful tool in the physiological and nutritional study of Vitamin E in sheep. Hidiroglou et al. (1970) found that direct administration of the vitamin to lambs that were nursing ewes fed dystrophy-producing hay completely prevented dystrophy in the lambs. However, Madsden et al. (1935) reported that sheep fed cod-liver oil can be affected by muscular dystrophy. Since little work has been done to clarify the mechanism of the antagonism between cod-liver oil and Vitamin E and the resulting Vitamin E deficiency symptoms in ruminants, the authors examined the effect of cod-liver oil, administered orally, on the movement of radiotocopherol in the rumen, its distribution in the tissue, the rate of its removal from the blood, and the excretion of labeled Vitamin E by sheep.

Sixteen sheep were fed hay (supplemented daily with urea and sucrose, and weekly with Vitamins A and D) obtained from an area in northern Ontario where nutritional muscular dystrophy is common. After 8 mo., the sheep were placed in metabolism cages, dosed with a single dose of ^{3}H-DL-α-tocopherol, and, 5 days before and 5 days after the dosing, half were given daily doses of 10 g. of medicinal-quality cod-liver oil. During the 5 days after the radiotocopherol dosing, radioactivity was higher in the rumen liquor of the sheep fed the cod-liver oil than in that of the untreated sheep. The sheep fed cod-liver oil had significantly lower levels of radioactivity in the nonsaponifiable material of their tissues

(over)

3.330 (3.19)

The object of this invention is to solve these problems. By passing a direct current through the fish, which is immersed in an electroconductive liquid medium, the processor can greatly reduce or remove the salts in the product; appreciably lower the concentrations of the ions of magnesium, ammonia, and phosphoric acid; and prevent the formation of struvite crystals. Not only will the process effectively prevent discoloration by removing other inorganic ions, it will also improve the flavor of fish that is not fresh by removing amines (which are present as positive ions and adversely affect flavor). At the same time, it precooks the product.

As part of their detailed description, the inventors give seven examples of the nature and utility of the process. These illustrations concern the electrical processing of tuna, the electrical processing of steam-cooked tuna, and the test canning of tuna processed by steam cooking and by electrical processing. Four tables give some of the data from the two general kinds of commercial processing--batch processing, in which electric current is passed simultaneously through a large number of fish carcasses; and continuous processing, in which current is passed through fish carcasses as they are conveyed along a processing line.

From the examples, the inventors draw three conclusions: (1) when electric current is passed through a cut of fish meat, the quantity of Mg^{++}, NH_4^+, PO_4^{---}, and volatile base nitrogen is markedly reduced, approaching zero as processing time elapses; (2) although during electrical processing on a large scale the removal of Mg^{++} is incomplete, no detectable struvite is formed in the cans; and (3) since the primary cause of struvite formation in canned tuna is ammonia and not magnesium, as is commonly believed, the quantity of ammonia removed during processing can be used as a quality control standard. LB

3.336 (3.338)(7.74) EXAMENES FÍSICO-MECÁNICOS COMPLEMENTARIOS DEL CIERRE DE LA LATA [PHYSICOMECHANICAL TESTS OF THE IMPERMEABILITY OF TIN CANS]

Rojas G., Hugo F.

Estudios e Investigaciones No. 1, 20 pp. (1969) (In Spanish; English Abstract)
(Biblioteca y Publicaciones, PRODEPESCA, Apartado Aéreo No. 17798, Bogotá, Colombia)

The present paper deals with the improvements achieved in recent years in the canning preservation of food, including the manufacture of the can itself, the double seamer and its control in the colombian fish processing factories, description of the more common methods employed in the so-called permeability tests; considering among others: Test using vacuum inside the can, the passage of hydrogen into the can through an assumed perforation, the so-called "biological method" which studies the entry of microorganisms into the can, and finally the r[o]utine physical examination of the cuts of the double seams.
[12 figures, 5 references, 1 appendix] Author's abstract

3.337 EXPERIMENTAL FORMULAS FOR ACCURATE ESTIMATION OF TRANSIENT TEMPERATURE OF FOOD AND THEIR APPLICATION TO THERMAL PROCESS EVALUATION

Hayakawa, Kan-ichi (Food Science Department, Rutgers University--The State University, New Brunswick, New Jersey)

Food Technology 24, No. 12, 89-100 (December 1970)

The author developed experimental formulas that can be used to estimate accurately the temperature history curves of canned or refrigerated food during the heating and cooling treatments. By use of these experimental formulas, accurate estimations can be made of the heat processes for canned foods.
[3 figures, 6 tables, 16 references, 2 appendixes] FTP

4.15 (5.7)(4.90)

than did the untreated sheep. Using column chromatography, thin-layer chromatography, and radioautography, the authors identified the major part of liver radioactivity as unchanged α-tocopherol. Possible reasons for the difference in the levels of radioactivity in the tissues of the two groups of sheep are proposed.

Although blood values for the sheep fed cod-liver oil tended to be lower than those for the untreated sheep, the differences throughout the sampling period were never significant. Urinary excretion was greatest in the untreated sheep; fecal excretion in the treated sheep. Sternberg and Pascoe-Dawson (1959) suggest that urinary excretion is an index of tissue utilization of circulating Vitamin E whereas fecal excretion is an index of the unabsorbed vitamin. This hypothesis and its implications are discussed. [2 figures, 5 tables, 19 references] LB

4.0 TOPICS IN LIPID CHEMISTRY (9.6)

Gunstone, F. D. (editor)

Vol. 1, ix + 451 pp. Published by Logos, in association with Elek Books:London, England (July 1970) 160s.
Reviewed by P. B. Garland
Nature 228, No. 5269, 391-392 (October 24, 1970)

This book is the first in a series that will provide a continuing review of the chemistry, physics, and technology of lipids, including the biological aspects. The appendix contains a list of books and reviews on the subject published in the last 8 years. Some of the topics considered are: physicochemical procedures for separation and characterization of naturally occurring lipids; gas-liquid chromatography for the determination of structure of fatty esters; mass spectrometry; hydrogen catalysis; optically active long chain compounds. The reviewer suggests that this volume is an excellent reference source for the specialist. FTP

3.3344

increased only slightly as the time of processing increased. Heat pasteurization at 190° F. caused considerable blueing, the intensity of which did not increase with length of processing time or of storage time.

Thus, under the conditions of this experiment, the crab meat could be pasteurized at 170° F., using processing times of up to 30 minutes, without the crab meat becoming blue.

The blueing that accompanies the overheating of the crab meat is blue-grey and is evenly dispersed through the meat. It does not appear to be the same as that occasionally described in the literature as a true-blue discoloration.

The crab meat aged in a cooler for varying lengths of time before being pasteurized did not change in color during storage, and the color did not change when the meat was pasteurized nor when it was subsequently stored at 38° F.

When crab meat was pasteurized in C-enamel cans in which the enamel was purposely scratched, the meat became discolored only where it was in contact with the side seams of the can. This discoloration was brown, however, and was not typical of the blue color sometimes found in pasteurized crab meat. Another experiment also showed that solder is not the cause of blueing in pasteurized crab meat.
[3 tables, 12 references] Reprinted in part

3.33 (8.0)(1.88) EFFECT OF TECHNOLOGICAL PROCESSING ON THE FOOD VALUE OF MUSSELS

Korobkina, G. S., E. N. Danilova, and N. N. Kalinina (Inst. Pitan., Moscow, U.S.S.R.)

Chemical Abstracts 72, No. 15, 77591n (April 13, 1970)

4.5 ANTIOXIDANT EFFECT OF TOCOPHEROLS ON AUTOXIDATION OF MILK FAT. PART III. RELATION OF ANTIOXIDANT ACTIVITY OF TOCOPHEROLS WITH FAT GLOBULE MEMBRANE LIPID

Kanno, Chouemon, Kunio Yamauchi, and Tomikichi Tsugo (Department of Agricultural Chemistry, Faculty of Agriculture, University of Tokyo, Bunkyo-ku, Tokyo, Japan)
Agricultural and Biological Chemistry 34, No. 11, 1652-1657 (November 1970)

The surface area of the fat globules in milk is rich in phospholipids. The phospholipids contain a higher level of polyunsaturated fatty acids than do the triglycerides in the fat globule. This paper reports on a study of the antioxidant activity of A-, γ-, and δ-tocopherols on the lipids extracted from the milk fat globule membrane and also the antioxidant activity of membrane lipid and tocopherols in milk fat obtained by churning.

The fat globule membrane lipid is readily autoxidizable and develops a fishy off-flavor and brown color. α-, γ-, or δ-tocopherol inhibited the formation of peroxide and reduced the degree of browning.

Addition of membrane lipid to milk fat obtained by churning prolonged the induction period during the oxidation of the milk fat. The authors believe that this is a synergistic action between the tocopherols and membrane lipid. They suggest, therefore, to improve the stability of milk and dairy products, that tocopherols, rather than synthetic antioxidants, should be used.

[4 figures, 3 tables, 16 references] FTP

4.5 DEVELOPMENT OF RANCIDITY DURING SHORT-TIME STORAGE OF COOKED POULTRY MEAT

Jacobson, Marion (Department of Home Economics, College of Agriculture Research Center, Washington State University, Pullman, Wash 99163), and Helen H. Koehler
Journal of Agricultural and Food Chemistry 18, No. 6, 1069-1072 (November-December 1970)

Cooked poultry meat rapidly loses its flavor when held at refrigerated temperature. The flavor change is probably due to oxidation of the lipids; B. M. Watts [Proc. Flavor Chem. Symposium, Campbell Soup Co., pp. 83-96, Camden, New Jersey, (1961)] stated that the flavor change resulted from the oxidation of the unsaturated lipids that are metabolically active within the cellular structures of lean muscle tissues. M. W. Zipser and B. M. Watts [Food Technol. 15, 318 (1961)] found that the degree of change in odor of cooked mullet depended upon the character of the lipids and the quantity of heme pigments in the tissue. However, freezer temperatures, certain antioxidants, and exclusion of oxygen inhibited the change. This paper reports on further studies of the development of rancidity in cooked chicken and turkey meats during short periods of refrigerated and of frozen storage. The TBA (2-thiobarbituric acid) test and sensory tests were carried out on the samples. The meats were examined newly cooked, then after 2 and 4 days of storage, refrigerated (4° C.) or frozen (-20° C.). The effects of the addition of propyl gallate and of monosodium glutamate (MSG) were examined. The light and dark meat of chicken showed slight loss in flavor during frozen storage but showed pronounced flavor changes after refrigerated storage. TBA numbers for the light

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6.32 STUDIES ON THE COMPONENTS OF NAGA-KOMBU, LAMINARIA LONGISSIMA-- I. GENERAL COMPONENTS

Hosoda, Kiichi (Obihiro Ohtani Junior College, Hokkaido, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 7, 698-701 (July 1970) (In Japanese; summary and tables in English)

Immature and mature samples of the seaweed Laminaria longissima were analyzed. Data on average values of the components of the seaweed are shown in the following table.

Sample of laminaria longissima	Number of samples analyzed	Average composition on a moisture-free basis				
		Protein	Fat	Glucide	Fiber	Ash
		%	%	%	%	%
Mature seaweed	5	14.04	4.92	44.62	12.67	23.75
Immature seaweed	5	16.82	2.76	31.71	13.98	34.74
Ascus parts of mature seaweed	3	15.86	7.49	45.11	10.72	20.82
Components of mature seaweed less ascus parts	3	12.91	4.26	42.63	14.20	25.99

[4 tables, 5 references] FTP

6.34 VARIATIONS IN PHOSPHORUS UPTAKE BY ALGAE

Azad, Hardam S., and Jack A. Borchardt (Department of Civil Engineering, University of Michigan, Ann Arbor 48104)
Environmental Science & Technology 4, No. 9, 737-743 (September 1970)

Plants require phosphorus for conversion of solar energy to biochemical energy. Domestic, industrial, and agricultural sources have contributed a continuous supply of this element to the aquatic environment and thereby have increased the levels of plant growth. However, we do not fully understand the basic mechanism through which phosphorus acts to stimulate aquatic plant growth. This work, then, was carried out to examine the cause and effect relationships that exist among the major factors that influence algal growth and the interaction of these factors with the existing phosphorus concentration in the aqueous environment.

Two strains of green algae (Chlorella and Scenedesmus) were grown in the laboratory under different environmental and physiological conditions. Chemical and physiological responses of the algae were observed under an orderly variation in the concentration of a carefully prepared synthetic feed. The effects of light intensity, algal cell density, dirunal cycle, temperature, mixing (mechanical agitation of the cultures), and alternate phosphate starvation and phosphate enrichment of algal cultures were studied.

The physical variables affected the mass rate of growth of the algae and the pattern and amount of phosphorus uptake. Three types of uptake of phosphorus were found: the metabolic, for maximum growth; the storage, having no effect on growth; and the starvation, by phosphorus-starved algae.

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ment increased as the flavor progressively deteriorated; the TBA numbers for the dark meat held refrigerated or frozen were not significantly different during the storage period.

The TBA numbers for the cooked light and dark meat of turkey correlated significantly with flavor changes ($r = -0.77$)-- oxidative changes occur as flavor deteriorates during refrigeration. Addition of propyl gallate prevented the changes measured by the TBA test, but MSG did not. Apparently, the chemical (TBA) test gave useful evidence of flavor change. [4 tables, 9 references] FTP

6.34

The authors suggest from these results that: The chemical composition of a sample of the standing crop of algae from a lake or river might easily show a range from about 0.5% to over 20% PO_4 by weight. Under the most common natural situations, this range might be narrowed to from about 1% to 15% PO_4. Assuming an environmental situation with an excess of phosphorus, the composition of the algae should be about 10% PO_4 by weight. As the amount of phosphorus in the environment decreases, the algae should contain less phosphorus without showing any effect on their growth until the critical concentration of phosphorus is reached (about 3% PO_4 by weight). "Normal" algae, then, may generally contain 3% to 10% PO_4 by weight. [12 figures, 14 references] FTP

6.54

VERFAHREN ZUR HERSTELLUNG EINES NAHRUNGSMITTELPRODUKTES AUF DER GRUNDLAGE VON FISCH

[METHOD OF PRODUCING A FOOD BASED ON FISH]

Daban, M., and H. J. Teboul (pat.)
West German Patent Application 1,517,014 (1969)
Food Science and Technology Abstracts 2, No. 9, Item 9R327, 1329 (September 1970)

A new preservable food is based on fish, preferably of the tunny variety. It can be made to look very much like boiled ham or canned sausage or fish fillet. It does not smell or taste like fish but resembles boiled ham or cooked meat.

The fish is cured in a pickling solution similar to that used for treating hams and other meats. After being pickled for from 10 to 15 hours in the solution (which is kept at temperatures of from 4° to 10° C.), the fish are sealed in cans and heated either slowly or rapidly. Extracter: LB

6.54 (0.7)

AVAILABILITY OF FLUORIDE FROM FISH PROTEIN CONCENTRATE AND FROM SODIUM FLUORIDE IN MAN

Spencer, Herta, Dace Osis, Emilie Wiatrowski, and Joseph Samachson (Metabolic Section, Veterans Administration Hospital, Hines, Illinois 60141)
Journal of Nutrition 100, No. 12, 1415-1424 (December 1970)

The purpose of this study was to determine in man the extent of the absorption of fluoride from fish protein concentrate (FPC) prepared from hake and to compare this absorption with the absorption of fluoride given as sodium fluoride. The studies were performed on adult man under strictly controlled dietary conditions. Metabolic fluoride balances were determined in the control studies, during the intake of FPC-supplemented diet, and during the intake of equivalent amounts of fluoride given as sodium fluoride. The intake of fluoride and the urinary and fecal excretion of fluoride were determined.

The fluoride uptake in the control study averaged 4.4 mg./day and the fluoride balance +1.9 mg./day. In the FPC-supplemented diet phase, the fluoride intake averaged 12 mg./day and the fluoride balance +4.7 mg./day. In the FPC study, the fecal fluoride excretion was higher than in the NaF study (1.4 mg. in the former and 0.88 mg. in the latter), and the fluoride balances were slightly lower (+4.7 vs +5.4 mg./day). These data show that fluoride is readily available from FPC. The net fluoride absorption when given as FPC was 88% and when given as NaF was 94%. Although the net difference was statistically significant, it is small and does not appear to be of physiological importance.
[7 tables, 25 references] FTP

4.85

TESTS FIND NEW USE FOR FISH OIL

Anonymous
Fishing News International 9, No. 11, 71 (November 1970)

The South African Fishing Industry Research Institute, Cape Town, notes (in its latest annual report--No. 23 for 1969) the results of tests on the use of fish oil as a release agent. When the tests, which were conducted in cooperation with the Portland Cement Institute, indicated that fish oil has excellent properties as a coating for cast-concrete molds, several engineering firms were given samples of the oil to test. They reported that the fish oil produced a smoother cement surface and left the mold cleaner than other release agents do; in addition, it caused less adhesion between mold and casting. Concrete blocks cast in molds coated with crude and deodorized fish oils at no stage of curing developed a noticeably abnormal smell. The report concludes that fish oil, in normal use as a release agent, should present no serious odor problem. LB

2.114

MARINE DIESEL LUBRICATION

Clark, G. H.
Arthur Conway (reviewer)
Burmah-Castrol Marine, 195 pp. 85s.
New Scientist 48, No. 730 (December 17, 1970)

This book begins with a note on the use of lubricants through the ages, including a few pages on the origin of petroleum, the addition of additives to oils, and the chemistry, physics, testing, and properties of oils. Then it gets down to the basic problem of friction and how to prevent it by lubrication. The third chapter deals with bearings; the following ones, with the hydrocarbons and the various marine engines they power. This survey of the marine engineer's art consists basically of two studies of lubrication: one relates to large crosshead engines and the other to trunk-piston diesels. The final chapters deal with the cooling, preservation, cleaning, and flushing of lubricating systems; the testing of oils; and the properties produced by the compounds that go to make up the lubricants. The book's six appendices contain data on viscosity and temperature. LB

6.32

STEROLS OF RED ALGAE

Alcalde, Antonio, Michael Berbier, P. Potier, A. M. Maguet, and J. Teste (Inst. Chim. Substr. Nat., C.N.R.S., Gif-sur-Yvette, France)
Chemical Abstracts 72, No. 17, 87164q (April 27, 1970)

6.54 THE FISH PROTEIN CONCENTRATE STORY.
12. PROCESSING OF PROTEIN ENRICHED WAFERS

Moorjani, M. N. (Central Food Technological Research Institute, Mysore 2A, India)
Food Technology 24, No. 12, 60-63 (December 1970)

This article describes a process for making protein enriched wafers from a mixture of cassava starch, fish protein concentrate, salt, and water. The process is as follows: (1) Mix together cassava starch, fish protein concentrate, salt, and water (proportions: 1.5 kg./0.3 kg./0.07 kg./1.53 liters); (2) blend mixture by passing it through an 8 mesh sieve; (3) granulate the blended mixture into globules by use of a reciprocating type mechanical shaker; (4) partially gelatinize the globules by heating them at 130°-150° C.; (5) arrange the partially gelatinized globules in a single layer in a shallow glass container and further gelatinize the globules by spraying them with a fine mist of water and then steaming them (the globules bind together to form a wafer); (6) dry the gelatinized material in a flow-through dryer to a moisture content of 5-6% (3 to 4 hours at 45°-50° C.); (7) when dry, remove the wafers from the shallow glass containers and pack them into polyethylene plastic bags.

The wafers are prepared for consumption by frying them for a few seconds in edible fat. When fried, the wafers expand considerably and become crisp. They are especially tasty when eaten just after deep fat frying.

A paste of shrimp muscle can also be used but special precautions must be exercised in using this raw material. Incorporation of large amounts of shrimp muscle interferes with globule formation and the expanding property of the fried wafers.

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6.54 ENZYMATIC MODIFICATION OF PROTEINS IN FOODSTUFFS
(0.6) Card A

Fujimaki, Masao, et al. (Department of Agricultural Chemistry, University of Tokyo, Tokyo, Japan)
Agricultural and Biological Chemistry 34, No. 9 and 10, 1325-1337, 1484-1500 (September and October 1970)

PART I. ENZYMATIC PROTEOLYSIS AND PLASTEIN SYNTHESIS APPLICATION FOR PREPARING BLAND PROTEIN-LIKE SUBSTANCES
Fujimaki, Masao, Michiko Yamashita, Soichi Arai, and Hiromichi Kato, pp. 1325-1332.

The following articles are part of a continuing study of the enzymatic modification of soy protein as a means of increasing its usefulness as a foodstuff.

The purpose of this study was to prepare proteinlike food products free from unfavorable odor, taste, and color by peptic hydrolysis of certain protein concentrates and subsequent production of plastein. The protein concentrates that were prepared and used were from soybeans, codfish, chlorella, wheat, milk, baker's yeast and hydrocarbon-assimilating yeast (Candida).

The protein concentrates from each of the products were partially hydrolyzed with pepsin and the odorants, fats, and coloring substances were removed by extraction with ether. The protein hydrolyzates that resulted were bitter. These bitter hydrolyzates were then incubated with added α-chymotrypsin producing higher-molecular weight proteinlike substances (plasteins); these plasteins were almost free of bitter flavor and had little, if any, undesirable flavor, odor, or color.

Various enzymes and enzyme preparations were examined for their ability to produce plastein from a peptic proteolyzate of soy protein. Two commercial proteinases (Bioprase and Prozyme) were equally as effective in producing plastein as was α-chymotrypsin. [3 tables, 33 references]

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6.54 FPC'S QUALITY VIRTUALLY THE SAME AS ITS RAW MATERIAL'S QUALITY

Dubrow, D. L., E. R. Pariser, N. L. Brown, and H. Miller, Jr. (National Center for Fish Protein Concentrate, National Marine Fisheries Service, College Park, Maryland 20740)
Commercial Fisheries Review 32, No. 12, 25-31 (December 1970)

In this study, the researchers compared the chemical composition and nutritive quality of fish protein concentrate (FPC) with that of the raw fish (red hake) used as starting material. The chemical analyses consisted of moisture, ash, crude protein, lipid, amino acids (lysine, histidine, arginine, aspartic acid, threonine, serine, glutamic acid, proline, glycine, alanine, valine, methionine, isoleucine, leucine, tyrosine, and phenylalanine), and available lysine. The protein efficiency ratio (PER) was determined by rat feeding tests.

The study showed that the quality of FPC generally is no different from that of the raw material from which it was prepared.

[6 tables, 12 references] FTP

6.54 ENZYMATIC MODIFICATION OF PROTEINS IN FOODSTUFFS
(0.6) Card B

PART III. PHENOMENAL SURVEY ON α-CHYMOTRYPTIC PLASTEIN SYNTHESIS FROM PEPTIC HYDROLYZATE OF SOY PROTEIN
Yamashita, Michiko, Soichi Arai, Jun Matusyama, Makoto Gonda, Hiromichi Kato, and Masao Fujimaki, pp. 1484-1491.

The peptic hydrolyzate of soy protein was treated with α-chymotrypsin under the following conditions: substrate concentration, 20%; enzyme/substrate ratio by weight 1/100; pH, 7.0; temperature, 37° C. The yield of plastein after 24 hr. depended upon the degree of hydrolysis of the substrate--the optimum degree of hydrolysis for the highest plastein yield was about 80°. The peptic hydrolyzate of soy protein was bitter, but the bitterness decreased with increasing yield of plastein. The plastein reaction, under the conditions described, apparently resulted in the production of higher molecular weight proteinlike substances.
[5 figures, 2 tables, 17 references]

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6.10 INFORMACÕES PRELIMINARES SÔBRE A FARINHA DE LAGOSTAS
[PRELIMINARY REPORT ON FLOUR FROM SPINY LOBSTER]

Vieira, Gustavo Hitzschky Fernandes (Laboratório de Ciências do Mar da Universidade Federal do Ceará, Fortaleza, Ceará, Brasil), Raimundo Pôrto Monteiro (Secretaria de Agricultura do Estado do Ceará, Fortaleza), and Maria da Conceição Caland Noronha (Laboratório de Ciências do Mar)
Pesca & Pesquisa 2, No. 3, 115-117 (September-December 1969) (In Portuguese; English summary)

Despite the need for a protein supplement for use in the rations of Brazilian domestic animals, there is no fishmeal-producing industry in northeast Brazil. Yet, between 1955 and 1968, no less than 30,000 tons of cephalothoraxes from spiny lobsters was wasted by processing firms in the area. This waste was carried out to sea to pollute the fishery, or it settled and created unsanitary conditions at the docks or around the processing plants.

In this paper, the authors report on the results of their laboratory experiments to produce flour from the cephalothorax of two species of spiny lobster, Panulirus argus (Latreille) and Panulirus laevicauda (Latreille). They processed the lobster waste in four stages: autoclaving at 100° C. for 20 min., pressing, drying, and grinding. The flour so obtained had a uniform color and an odor characteristic of the original material; yield averaged 30% by weight. Chemical analyses showed that the product had, on the average, the following composition, in percent: moisture, 10.3; protein, 39.6; fat, 3.2; ash, 35.9; and calcium (in the ash), 11.8. Despite the preliminary nature of the work, they conclude that the prospects for a meal-producing industry in which lobster waste is used as the raw material is promising. [1 table, 2 references] LB

6.54

The following table summarizes optimum conditions for the processes involved in the production of cassava flour-fish protein concentrate (FPC) wafers.

Processing step	Description of optimum condition of processing step
Granulating the cassava flour/FPC/salt/water blend (forming the globules)	Mixture should have moisture content of 45-50%
Partially gelatinizing the globules	Heat globules at 130°-150° C. for 10-15 min.
Gelatinizing the globules in glass dishes	Moisture content 60-65%, steam at atmospheric pressure for 5 min.
Drying wafers	Dry wafers for 3-3½ hr. at 45°-50° C.
Moisture content of wafers	5-6% (The wafers become distorted if dried below this moisture level.)

FTP

Sharp, Kenneth H. (pat.)
South African Patent 6,902,915
Chemical Abstracts 73, No. 21, 108490E (November 23, 1970)

6.54 STABILIZATION OF RAW PROTEIN FROM FISH, BY COMMINUTION AND FORMALDEHYDE TREATMENT

6.54 (0.6)

PART IV. BITTER DIPEPTIDES AS PLASTEIN-BUILDING BLOCKS DEBITTERING OF PEPTIC PROTEOLYZATE WITH α-CHYMOTRYPSIN
Yamashita, Michiko, Soichi Arai, Jun Matsuyama, Hiromichi Kato, and Masao Fujimaki, pp. 1492-1500.

The proteolyzate obtained by treating soy protein with pepsin was bitter and contained 80.0 μmole% of glycyl-L-leucine (Gly-Leu) and 64.7 μmole% L-leucyl-L-phenylalanine (Leu-Phe). When the proteolyzate was treated with α-chymotrypsin (plastein reaction), the resulting product was not bitter and did not contain Gly-Leu or Leu-Phe. Both Gly-Leu and Leu-Phe were not hydrolyzed by α-chymotrypsin, but when they were added to the peptic hydrolyzate and the mixture treated with α-chymotrypsin the Gly-Leu disappeared within 24 hr. and Leu-Phe disappeared within 4 hr. From this observation and other tests, the authors concluded that Gly-Leu and Leu-Phe (bitter peptides) play roles, along with other peptides in the peptic hydrolyzate, in the building block of plastein, and hence are deprived of their bitterness. The leucine terminus of the Gly-Leu was the primary participant in the plastein reaction and, as a result, the glycyl-L-leucyl residues seemed to localize in the N-termini of the plastein chains. Both termini of the Leu-Phe participated in the plastein reaction and, as a result, the L-leucyl-L-phenylalanyl residues seemed to be distributed fairly uniformly in the plastein chains. [5 figures, 4 tables, 8 references] FTP

6.54 (0.6)

PART II. NUTRITIVE PROPERTIES OF SOY PLASTEIN AND ITS BIO-UTILITY EVALUATION IN RATS
Yamashita, Michiko, Soichi Arai, Makoto Gonda, Hiromichi Kato, and Masao Fujimaki, pp. 1333-1337.

This work is a continuation of the study to utilize plastein as a food product. The article reports on the nutritive value and biological value of the plastein obtained by hydrolyzing the protein of soybean then treating the proteolyzate with a microbial protease (Bioprase).

The hydrochloric acid precipitated fraction of soybean protein was hydrolyzed with pepsin until the hydrolyzate showed 20% by weight of a fraction insoluble in 10% trichloroacetic acid. Soy plastein was obtained by incubating the hydrolyzate with added microbial protease.

The soy plastein contained 78.2% nitrogenous material, 7.9 carbohydrate (as mannose), 5.4% ash, and 5.4% moisture. Its constituent amino-acid composition was similar to that of the original soy protein. Chemical scores of the soy plastein (based on its essential amino-acid pattern) were: protein score, 76 (S-containing amino acids); milk score, 67 (leucine); and egg score, 60 (S-containing amino acids). [The author indicated that the scores were calculated on the basis of the "Report of a Joint FAO/WHO Expert Group," Wld Hlth Org. Techn. Rep. Ser. (1965) 301]. Pepsin digestibility in vitro of the soy plastein was 84.8% and the trypsin digestibility was 76.5%--about the same as denatured soy protein. In feeding tests with rats, soy plastein showed: true digestibility, 90.3% and biological value, 66.8.
[2 figures, 3 tables, 8 references] FTP
[Continued on Card B]

6.54 (0.12)(9.19) DISPOSAL OF WASTEWATER IN KAMABOKO INDUSTRY. I. REMOVAL OF PROTEIN FROM WASTEWATER WITH COAGULANT

Takahashi, Takashi, Masayuki Kizawa, and Masato Miyake
Journal of Faculty of Fisheries, Prefectural University of Mie 8, No. 1, 53-62 (December 20, 1969) (In Japanese; figures, tables, and résumé in English)

In this report, the authors give the results of their analyses of the wastewater, including the effluent from the fish-washing processes, from a kamaboko plant and of their attempts to remove the protein from the water. The experiments were conducted in mid-September, -November, and -February and at various hours during the day.

COD (chemical oxygen demand), BOD (biological oxygen demand), and pH of the wastewater were determined, as well as the concentration of total solids, suspended solids, crude fat, total nitrogen, soluble nitrogen, and soluble protein nitrogen. Fish oil and nitrogenous matter were the main components of the water. Well over 50% of the total nitrogen was soluble, and between 40 and 50% of the soluble nitrogen was protein nitrogen.

To remove the nitrogenous matter, the authors added an appropriate volume of 1% aluminum sulfate or ferric chloride to the wastewater and stirred the mixture till the solids were completely dissolved (pH was adjusted by addition of NaOH). After the mixture had settled for 3 hours, the supernatant was analyzed; the sediment was collected, aerated, and used as a coagulant. The optimum pH for removal of nitrogenous matter was 7.0 for aluminum sulfate and between 6.0 and 7.0 for ferric chloride. The ability of the two chemicals to coagulate raw wastewater was

(over)

6.81 YELLOW PIGMENTS OF PEARL

Koizumi, Chiaki, and Junsaku Nonaka (Tokyo University of Fisheries, Konan-4, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 10, 1054-1066 (October 1970)

Yellow pearls appear fairly often among cultured pearls. Although they are iridescent, their commercial value is small because their color is considered undesirable. Kosaki (1947) reported that the yellow color is due to porphyrins, but Sawada (1961) considered the iron complex of peptides more important.

I. CAROTENOID PIGMENT IN YELLOW NACRE, pp. 1054-1058.

The authors extracted the acetone-soluble pigments in the nacre of yellow pearl and separated the carotenoid pigment for spectrophotometric analysis. The absorption properties of the pigment were quite similar to those of flavoxanthin; they were identical to those found by Sawada in 1957 for the pigments of pink, yellow, and green pearls. From this finding, the authors conclude that, although carotenoid pigments may contribute to the yellow coloration, other pigments are probably involved. [3 figures, 1 table, 10 references]

II. HCl-METHANOL SOLUBLE YELLOW PIGMENTS, pp. 1059-1066.

Using 1 N HCl-MeOH (2 N HCl:methanol, 1:1), the authors extracted the yellow pigments from the nacres of yellow pearls, fractionated them by paper chromatography, and analyzed their constituents. They found 15 amino acids whose composition resembled that of pearl conchiolin. The acid hydrolyzate of the pigment

(over)

7.51 INTENSITY OF STREAMING BIREFRINGENCE AND SEDIMENTATION OF KCl EXTRACTS OF FISH MEAT

Okada, Minoru, and Koichi Kanna (Tokai Reg. Fish. Res. Lab., Kachidoki, Chuo-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 10, 1088-1091 (October 1970) (In Japanese; figures, table, and summary in English)

The streaming birefringence (SB) of 0.6 M KCl extracts from about 140 fish meats having various histories was measured with an SB detector. The intensity of SB was plotted on a 6-point scale against (1) the protein content of the extracts, (2) the protein content of the actomyosin solution, (3) the sedimentation coefficient of the actomyosin components of the extracts, (4) the height of the peaks of the actomyosin components in ultracentrifuge patterns, and (5) sedimentation of the actomyosin components of the extracts.

SB was detectable in the actomyosin solution but not in the myosin solution. The intensity of SB was not related to the protein content of the extracts. It did, however, increase as the sedimentation coefficient (S_{20}) of the actomyosin decreased, and it correlated well with the height of the actomyosin peak in ultracentrifuge patterns. [5 figures, 1 table, 3 references] LB

7.51 REVIEW OF METHODS FOR REMOVING OR SOLUBILIZING PROTEINS IN BIOLOGIC FLUIDS

Martinek, Robert G.
Chemical Abstracts 73, No. 11, 52843d (September 14, 1970)

7.51 (6.193) EFFECT OF GLUTAMIC ACID AND ANTIACIDS ON CHICK BIOASSAY OF PROTEIN QUALITY OF FISH MEALS

Miller, David, and Robert R. Kifer (National Center for Fish Protein Concentrate, National Marine Fisheries Service, College Park, Maryland 20740)
Poultry Science 49, No. 5, 1327-1334 (September 1970)

The purpose of this study was to determine the effect on the quality of the protein of fish meals of the addition of (1) glutamic acid (as the HCl-salt or as the free-base form), (2) antiacids, and (3) essential amino acids (singly or in combination) in the presence of antiacids and glutamic acid (free-base form). Five feeding tests with chicks were carried out with diets containing 12% protein from fish meal. Five different fish meals were used as the single source of protein in seven basic diets (12% protein). Glutamic acid, without or with essential amino acids, was added to supply the protein equivalent of 3% (0.48% N × 6.25). Methionine, lysine, arginine, tryptophan, and histidine (essential amino acids) were added to determine the limiting amino acids. The antiacids $Al(OH)_3$ and $NaHCO_3$, when used, were incorporated at the 1% level.

When fish meal is fed as the sole source of protein to chicks, an excessive dietary level of lysine results. The growth depressant action of excessive levels of lysine in the diet was overcome by the addition of arginine.

The authors conclude that the excessive quantities of essential amino acids (lysine and possibly others) present when fish meal is fed as the sole cource of protein to chicks must be balanced or diluted by the addition of dietary non-essential nitrogen sources. In this study, they found that methionine became the

(over)

7.42 (9.19)

DETERMINATION OF MERCURY IN WATER AND SEDIMENT SAMPLES BY FLAMELESS ATOMIC ABSORPTION

Kalb, G. William (Div. of Geol. Surv., Ohio Dep. of Natur. Resour., Columbus, Ohio).
Chemical Abstracts 73, No. 22, 116039f (November 30, 1970)

7.42

CONCENTRATION OF TRACE METALS BY SOLVENT EXTRACTION AND THEIR DETERMINATION BY ATOMIC ABSORPTION SPECTROPHOTOMETRY

Sachdev, Sham L., and Philip W. West (Coates Chemical Laboratories, Louisiana State University, Baton Rouge 70803)
Environmental Science & Technology 4, No. 9, 749-751 (September 1970)

Trace metals (aluminum, beryllium, cadmium, cobalt, copper, iron, lead, nickel, silver, and zinc) can be concentrated by a simple extraction procedure for subsequent determination by atomic absorption spectrophotometry. A solution of diphenylthiocarbazone, 8-quinolinol, and acetyl acetone in ethyl propionate is used. The procedure is highly selective. The sensitivity of the test for aluminum is 0.1 μg. per ml. All of the rest of the metals can be determined when present at the low parts per billion level in an aqueous solution. The authors indicate that the procedure is well suited for environmental studies.

[4 tables, 9 references] PTP

6.54

DESIGN DATA FOR A LOW TEMPERATURE CONTINUOUS COUNTER CURRENT EXTRACTION PROCESS FOR PROTEIN CONCENTRATE PRODUCTION

Toledo, R. T.
Fd Trade Rev. 40, No. 9, 38 (1970)
BFMIRA Abstracts 24, No. 1, Abstract No. 179, p. 38 (January 1971)

A protein concentrate with functional properties equivalent to those of raw protein can be prepared by extracting deboned poultry, meat, or fish with isopropanol at temperatures below 50° C. (Abstract of paper read at the 1970 Annual Meeting of the I.F.T. held in San Francisco.) M.R.A. Reprinted

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6.54 (7.3)(1.55)

MANUFACTURING TECHNIQUES OF KAMABOKO USING POLLACK MEAT AS MATERIAL. INFLUENCE OF pH ON KAMABOKO-FORMING ABILITY

Fukumi, Toru, Masayoshi Nakamura (Hokkaido Cent. Fish. Expt. Sta., Yoichi, Japan)
Chemical Abstracts 73, No. 13, 65081d (September 28, 1970)

6.54 (0.12)(9.19)

the same; however, ferric chloride removed more protein than aluminum sulfate did. At a coagulation dose of 800 mg. per liter, ferric chloride removed 90% of the protein nitrogen, 55% of the total nitrogen, and 68% of the COD from the wastewater.

[5 figures, 4 tables, 6 references] LB

7.51

RAPID MICROESTIMATION OF PROTEINS BY MEMBRANE CHROMATOGRAPHY ON PVC ULTRAFILTERS

Přistoupil, T. I., and M. Kramlová (Institute of Hematology and Blood Transfusion, U nemocnice 1, Praha 2 (CSSR))
Experientia 26, No. 9, 1045-1046 (1970)

In earlier reports, the authors described a simple, rapid method for quantitatively estimating proteins by radial chromatography. However, proteins of low molecular weight (below about 100,000) could be adsorbed only at acid pH's (for example, 3.7) and those having a molecular weight of below 40,000 were impossible to estimate because they were insufficiently adsorbed on the carrier. In this report, the authors suggest that these limitations can be circumvented if polyvinylchloride (PVC) membrane filters are used instead of nitrocellulose membrane filters. The PVC membranes will adsorb proteins having a molecular weight of from 12,000 to 400,000 and at pH ranges of from 3.7 to 9.06. Calibration curves for various proteins are presented. [3 figures, 4 references] LB

7.51 (6.193)

first limiting amino acid when the dietary protein derived entirely from fish meal was diluted 25% on a nitrogen basis by the addition of glutamic acid in the presence of antacids. It was, however, possible that the added glutamic acid not only produced an improvement in the balance of the nonessential with essential amino acid but also supplied additional sources of dietary nitrogen.

[7 tables, 15 references] PTP

6.54

JAPANESE PRODUCE LIQUID PROTEIN FROM ANTARCTIC KRILL

Anonymous
National Fisherman 51, No. 10, 20B (February 1971)

The Tokai Regional Fisheries Research Laboratory of the Japanese Fisheries Agency has produced liquid protein from Antarctic-caught krill. The krill is reduced to a mash by being heated (at from 20° to 30° C.) with enzymes for 4 or 5 hours. The mash is 42% water, 42% protein, 8.7% sugar, 7.2% ash, and 0.1% fat. Commercial production is planned to begin this year. The product can be used in pet and snack foods and for flavoring soups; the shells will be used in animal feeds.

If the commercial production of liquid protein from krill proves successful, the laboratory will try to make a similar product from mackerel. LB

6.81

exhibited the characteristic purple-blue reaction of sugar when naphthoresorcine sulfuric acid was used as reagent. The authors suggest that a major yellow pigment of the yellow pearl may be a conchiolinlike protein substance having some sugar constituents. [5 figures, 2 tables, 9 references] LB

7.523 (7.524) ESTIMATION OF LYSINE AND SULFUR AMINO ACIDS BY SHORT ION EXCHANGE COLUMN METHOD

Lewis, Owen A. M., and Brigid M. G. Shanley (Botany Department, University College, Private Bag 4001, Durban, South Africa)
Journal of Agricultural and Food Chemistry 18, No. 6, 1178 (November-December 1970)

The authors describe a relatively inexpensive, short (40 cm.) ion-exchange column method for the determination of lysine, methionine, and cystine. Cystine and methionine are determined in their oxidized form (to avoid their loss during acid hydrolysis in the presence of carbohydrates). Cystine is oxidized to cysteic acid and methionine to methionine sulfone by performic acid [O. A. M. Lewis, Nature 209, 1239 (1966)]. Also, the hydrolysis of the material, the preparation of the Zeocarb 225, W.R. 1.5, −200 ion-exchange resin column, and the preparation of 0.5M, pH 2.80 buffer solution are described by Lewis (1966) [W.R. is the water regain value.]

The authors claim that the method for estimation of lysine, methionine, and cystine has an accuracy of 100 ± 3% when used on intact protein of known composition. [1 figure, 7 references] FTP

8.0 (6.10)(1.92) NUTRIENT CONTENT OF OFFAL AND SMALL FISH FROM SOME FRESHWATER FISH CULTURES

Boyd, Claude E. (Savannah River Ecology Laboratory, c/o U.S. Atomic Energy Commission, Savannah River Operations Office, P.O. Box A, Aiken, South Carolina 29801)
Transactions of the American Fisheries Society 99, No. 4, 809-811 (October 1970)

Commercial production of species of freshwater catfish is becoming a large industry in many regions of the United States. Carp and tilapia cultures are important in many nations, but commercial culture of these fish in the United States is not important at the present time. A large proportion of the fish flesh harvested from these fish cultures is offal and small fish not preferred for human consumption. Utilization of the offal as a protein supplement in animal feedstuffs would increase the efficiency of fish culture. Information on the quantity of offal and its nutrient composition is needed to assess the potential of this fishery by-product. The present study presents such data for channel catfish (Ictalurus punctatus), white catfish (I. catus), common carp (Cyprinus carpio), and Java tilapia (Tilapia mossambica).

(over)

7.89 ELIMINATION OF THE "pH EFFECT" IN CELL FRAGILITY DETERMINATIONS

Love, R. M., and M. Muslemuddin (Torry Research Station, 135 Abbey Road, Aberdeen AB9 8DG, Scotland)
Nature 228, No. 5272, 681-682 (November 14, 1970)

When frozen fish are stored, the properties of the flesh change. As a result, the flesh of the thawed fish becomes tough. Love and Mackay (1962; 1962a) developed a procedure for measuring the extent of the phenomenon (called the cell fragility determination). By their method, 200 mg. of fish flesh is gently homogenized in 20 ml. of dilute formaldehyde and the extent of disintegration of the muscle is measured in a colorimeter. The soft-textured flesh forms an opaque suspension of high light absorbance; the tissue of the toughened flesh forms a fairly clear medium having low light absorbance. Later, Love and other coworkers found that the colorimeter values were influenced by the pH of the fish muscle, in such a way that toughening of the flesh attributed to low pH (without cold storage of the fish) gave high light absorbance readings, whereas toughening attributed to frozen storage of the fish gave low absorbance readings. The cell fragility technique, therefore, was useless for quality control testing of frozen fish unless the pH could be determined also.

This paper reports on a modified method for cell fragility determinations developed by the authors. The modified technique employs stronger precipitants to counteract a dispersion of the proteins; the most satisfactory combination was 2% trichloroacetic acid in 1.2% formaldehyde. The sample size was reduced to 100 mg. to bring the absorbance within the sensitive range of the colorimeter. [1 figure, 5 references] FTP

8.42 (0.7) SELENIUM CONTENT OF FOODS

Morris, V. C., and O. A. Levander (Human Nutrition Research Division, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Maryland 20705)
Journal of Nutrition 100, No. 12, 1383-1388 (December 1970)

This paper reports values for the selenium content of a wide variety of foods representing a cross section of the American diet. The selenium content of the foods was determined by the fluorometric method of I. Hoffman, R. J. Westerby, and M. Hidiroglou [Journal of the Association of Official Analytical Chemists 51, 1039 (1968)]. The data suggest that diets well balanced in other nutrients are also adequate in selenium (possible effects of cooking, processing, geographical variation, and biological availability remain to be investigated). Some data on selenium content of meat, fish, and dairy products are shown in the following table.

(over)

7.9 (9.19) THE ANALYSIS OF PESTICIDE RESIDUES: NEW PROBLEMS AND METHODS

Lisk, Donald J. (Pesticide Residue Laboratory, Department of Entomology, Cornell University, Ithaca, New York)
Science 170, No. 3958, 589-593 (November 6, 1970)

This article is a review of the new problems and methods involved in the analysis of pesticide residues in animals (birds, fish), water, and other materials. Some not so apparent difficulties that may arise in analytical research studies on pesticides are: Analysis of samples of wildlife may be complicated because of lack of uncontaminated controls; reliable identification of a pesticide may require more than one method; other chemicals, such as other pesticides or industrial compounds (polychlorinated biphenyls), may interfere with the analysis; the pesticide is present in extremely low concentrations, usually in parts per trillion.

The paper considered the following subjects dealing with the analysis of pesticide residues: The refinement of gas chromatographic detectors and the development of new ones; the column substrate materials; the application of derivatization procedures; auxiliary techniques in gas chromatography; other chromatographic techniques (thin-layer and liquid-liquid chromatography); automation of pesticide residue analysis; Use of mass spectrometry for the analysis and elucidation of the structure of pesticides and their metabolites; other approaches, such as nuclear magnetic resonance, for the identification of the structure of pesticides; and approaches (such as ultraviolet, visible, infrared, and fluorescent spectrometry; neutron activation analysis; oscillographic polarography; and isotope techniques) for the analysis of pesticide residues.

[89 references] FTP

8.42 (0.7)

Product	Selenium[1] µg./gram	Product	Selenium[1] µg./gram
Egg		Beef	
Yolk	0.174, 0.193	Round steak	0.363, 0.318
White	0.057, 0.057	Ground	0.208, 0.189
Cheese		Liver	0.454, 0.409
American, processed	0.090, 0.090	Kidney	1.41, 1.69
Cottage	0.054, 0.050	Pork	
Swiss	0.101, 0.108	Chop	0.217, 0.261
Milk		Kidney	1.89, 1.90
Evaporated, canned	0.012, 0.013	Lamb	
Whole homogenized	0.013, 0.011	Chop	0.172, 0.184
Seafood		Kidney	1.38, 1.47
Lobster tail	0.634, 0.681	Chicken	
Shrimp, shelled, deveined	0.572, 0.604	Breast	0.106, 0.125
Cod, fillet	0.465, 0.390	Leg	0.121, 0.151
Flounder, fillet	0.335, 0.338	Skin	0.154, 0.146
Oysters	0.646, 0.659		

[1] Values are for separate assays of different aliquots from the same sample.

[6 tables, 18 references] FTP

7.879 (4.5)(7.8) STUDIES ON TBA-TEST I: ITS RELATIONSHIP TO TEMPERATURE AND APPLICATION TO OXIDATION PRODUCTS OF FATS OBTAINED BY VACUUM DISTILLATION

Marcuse, R. (Swedish Institute for Food Preservation Research, SIK, Göteborg, Sweden)
Fette.Seifen.Anstrichmittel 72, No. 8, 635-640 (1970) (Die Ernährungsindustrie)

Several aspects of the TBA (thiobarbituric acid) test were examined to determine the limitations of the test. For the development of color and measurement at 530 mµ, the author suggested heating at 95° C. Vacuum distillation for 30 min. was proposed for the isolation of the oxidation products.

[13 figures, 15 references] FTP

8.0 (6.10)(1.92)

Table 1.--Mean proximate composition and caloric content of offal from four species of fish and unharvestable sized Java tilapia

Species	Percent dry weight				Kilocalories/ gram dry weight
	Dry matter	Crude protein	Ether extract	Ash	
Ictalurus punctatus	42.3	41.8	44.0	13.8	6.28
Ictalurus catus	32.8	49.4	36.4	13.9	6.00
Cyprinus carpio	20.3	70.3	6.9	21.4	4.42
Tilapia mossambica					
Offal	32.3	43.6	36.1	13.9	5.88
Small fish	18.6	63.7	13.2	24.5	4.39

Utilization of this by-product presents certain problems. The materials contain large quantities of moisture, and offal from tilapia and catfish is high in fat. Ideally, the by-product should be converted into fish meal. The dehydration would decrease bulk storage and a considerable amount of the fat would be removed during processing. Most freshwater fish cultures are of limited scale and batch methods for processing these materials would have to be developed.

[1 table, 4 references] Reprinted in part

Chemical Abstracts 73, No. 13, 63618k (September 28, 1970)
Fish. Res. Lab., Tokyo, Japan)
Amano, Keishi, Kinjiro Yamada, Katsuhiko Harada, Yasutsugu Kamimoto (Tokai Reg.

7.81 (0.34) SEPARATION AND IDENTIFICATION OF VOLATILE AMINES FROM SOME MARINE ANIMALS BY THIN-LAYER CHROMATOGRAPHY

Chemical Abstracts 72, No. 13, 63991F (March 30, 1970)
Simmons, John Everette (Mar. Biol. Lab., Woods Hole, Massachusetts)

8.51 COMPOSITION OF THE AMINO ACID POOLS OF SOME CESTODES OF ELASMOBRANCH FISHES OF THE WOODS HOLE AREA

8.51 (0.39)(0.4) (1.9)

THE IMMUNOCHEMICAL REQUIREMENTS FOR SPECIFIC ACTIVITY AND THE PHYSICOCHEMICAL PROPERTIES OF EEL ANTI-HUMAN BLOOD-GROUP H(O) 7S GLOBULIN

Springer, G. F., and P. R. Desai (Department of Immunochemistry Research, Evanston Hospital, and Department of Microbiology, Northwestern University, 2650 Ridge Ave., Evanston, Illinois 60201)
Vox Sanguinis 18, No. 6, 551-554 (June 1970)

Eels have one of the most potent antihuman blood-group H(O) antisera known. This article discusses the prerequisites for H(O) reactivity of human and animal blood-group substances with this serum, characterizes the physicochemical properties of hapten-precipitated eel antibody, and distinguishes it from human 7S immunoglobulins.

The average chemical composition of antibodies from six eels differs from that of human IgG globulin. Glucosamine is the only sugar present in a concentration of greater than 0.1%; it averages 0.39%. Of the amino acids, eel antibody contains appreciably more arginine, aspartic acid, histidine, glycine, and alanine than does human IgG; however, it contains significantly less tyrosine, tryptophan, phenylalanine, proline, and lysine. Serine and alanine form the NH_2 termini, and serine and glycine the COOH termini. Thus only the carboxy terminals of the eel antibody are identical with those of human IgG. [11 references]

LB

9.12 (1.30)

WINTER DISTRIBUTION OF SALMON IN RELATION TO CURRENTS AND WATER MASSES IN THE NORTHERN PACIFIC OCEAN AND MIGRATIONS OF SOCKEYE SALMON

French, Robert R., and W. Bruce McAlister (Bureau of Commercial Fisheries Biological Laboratory, Seattle, Washington 98102)
Transactions of the American Fisheries Society 99, No. 4, 649-663 (October 1970)

Studies of the distribution of Pacific salmon (genus Oncorhynchus) indicated that various species and age groups have an affinity for certain environmental features as exemplified by water characteristics. In the winter of 1967 in the northeastern Pacific Ocean, immature age .1 and .2 sockeye salmon, chum salmon, and coho salmon were caught primarily in the Oyashio Extension and Subarctic Current Areas; maturing age .2 and .3 sockeye salmon were primarily in the Alaskan Stream and in the Alaskan Gyre (Ridge and Oyashio Extension Areas). The hypothesis is offered that maturing Bristol Bay sockeye salmon remain in the Alaskan Stream and Gyre in winter. The data suggested that some of the immature Bristol Bay sockeye salmon that will mature the following year recirculate in the Alaskan Gyre in the summer and do not make an extensive east-west migration, although other immature Bristol Bay sockeye salmon are known to migrate far to the west during the summer. [11 figures, 2 tables, 30 references] Authors' abstract

9.12 (9.11)

THE DISTRIBUTION OF MESOPELAGIC FISHES IN THE EQUATORIAL AND WESTERN NORTH ATLANTIC OCEAN

Backus, Richard H., James E. Craddock, Richard L. Haedrich, and David L. Shores (Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543)
Journal of Marine Research 28, No. 2, 179-201 (May 15, 1970)

Most mesopelagic fishes (those that inhabit the dimly lit upper midwaters of the open sea between about 100 m. and 1,000 m.) are daily vertical migrators. Moreover, they continually alter their depth, although most of the change is made at dawn and at dusk. In addition, such physical factors as water transparency and temperature, which seem to control the depths at which they lie, vary horizontally within distances of a few miles. For all these reasons, as well as for the size of the area involved, very little is known about the geographic distribution of any group of mesopelagic organisms in any ocean. Even less is known about the physical forces that control the distributions--although the "water mass" hypothesis (a theory that suggests that the ranges of pelagic animals conform to the water masses as defined by their temperature-salinity relations) is currently popular. Were this hypothesis sufficient, the zoogeography of the North Atlantic pelagial would be very simple, for it consists almost exclusively of one water mass--the North Atlantic Central Water. The authors have found, from examination of about 290 midwater-trawl hauls between 1961 and 1968, that the problem is far more complex. Here they offer some generalizations about their findings.

At least 10 physical boundaries determine the range of mesopelagic fishes. These boundaries clearly define six pelagic regions (the Slope Water Region, the

(over)

9.13

HISTIDINE METABOLISM IN FISH--V. THE EFFECT OF PROTEIN-DEFICIENCY AND FASTING ON THE ACTIVITIES OF HISTIDINE DEAMINASE AND UROCANASE IN CARP LIVER

Sakaguchi, Morihiko, and Akira Kawai (Research Institute for Food Science, Kyoto University, Kyoto, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 8, 783-787 (August 1970)

Earlier the authors found that free histidine occurred in relative high concentrations in the muscle of the young carp. Under normal physiological conditions, the level of free histidine is kept constant in the muscle. Histidine deaminase and urocanase (enzymes important in histidine catabolism) are believed to be regulated in some manner in the tissues of fish, and recent workers have reported that the levels of the enzymes in the muscle of rats varied with the administration of certain proteinaceous and nonproetinaceous compounds to the animals. The work reported here represents an initial exploratory step in an investigation of the regulatory mechanism of histidine metabolism in fish. Specifically, the authors report on the effect of protein deficiency and fasting for long periods on the levels of histidine deaminase and urocanase in carp liver.

The carp were fed three experimental diets over a 2-week period. One diet was high in casein (80%); another low in casein (5%); and the last was low in casein (5%) but contained added histidine (2.8%).

High histidine deaminase activity was found in the liver of the carp; low activity in the kidney and spleen; and no activity in the heart and the muscle. Urocanase activity in the liver tissue was higher than that in the kidney tissue.

(over)

9.12 (9.11)

Northern Sargasso Sea, the Southern Sargasso Sea, the Gulf of Mexico, the Caribbean Sea, and the Amazonian Region) and partly define four others (the Eastern Gyre, the Labrador Region, the Lesser Antillean Region, and the Guinean Region). The North Atlantic examined during these surveys was tentatively divided zoogeographically into a tropical part (composed of the Gulf of Mexico, the Caribbean Sea, and the Amazonian, Lesser Antillean, and Guinean regions), a northern part, and a broad transition zone separating the two--the Sargasso Sea. The Sargasso Sea, in turn, was divided into the cooler, more productive northern part (containing a mixture of northern and tropical species) and a warmer, less productive southern part (containing a few, mainly tropical, species). Rarely will fish species be restricted to a single region; rather, they occupy various combinations of regions. The 45 essentially warm-water species appearing during the survey exhibited seven distribution patterns, the most important being the tropical, the broadly tropical, and the Sargasso Sea patterns.

The authors say that they have insufficient data to define the distribution patterns of widespread species and species that range primarily in the eastern and northern parts of the North Atlantic. Each of these groups contains fishes that are distributed according to more than one pattern. The 22 species in the northern group are tentatively divided into three subgroups on the basis of the southern limit of their range in the west. Each pelagic region has a comparatively unique fish fauna, a characteristic assemblage of species in characteristic proportion and characteristic diversity. [17 figures, 2 tables, 32 references]

LB

9.13

Carp fed a low level of casein showed low levels of histidine deaminase and urocanase in the liver tissue in comparison to the level found in the liver tissue of the carp fed a high casein diet. In those carp fed a low casein + histidine diet, the level of both enzymes was higher than that found in the liver tissue of carp fed a low casein diet.

The histidine deaminase and the urocanase activity of the liver tissue of carp that had fasted for 2 weeks was higher per unit weight than was that of the fish on a high protein diet, but the activity levels were about the same when calculated on the whole liver weight basis. [4 tables, 10 references]

FTP

Wheeler, Alwyne (reviewer)
Biology of Coregonid Fishes, 569 pp. Published by the University of Manitoba, Winnipeg, Canada (1970). $8.
Lindsey, C. C., and C. S. Woods (editors)
Nature 228, No. 5274, 585-586 (November 7, 1970)

This book contains 35 papers presented before an International Symposium on Biology of Coregonid Fishes held in Winnipeg, Canada, on 25-29 August 1969. The coregonid fishes constitute a dominant group in the cold fresh waters of the northern hemisphere. Most of the papers deal with the classification or systematics of the group of fishes. The rest of the papers deal with parasitology, ecological aspects, reproductive biology, and fisheries topics.

[1 reference]

FTP

8.53 (1.92) A COMPARATIVE STUDY ON FATTY ACID COMPOSITIONS OF THE NATIVE AND REARED SILVER CARPS, BIG HEADS, AND GRASS CARPS

Shimma, Yaichiro, and Hisako Shimma
Bull. Freshw. Fish. Res. Lab., Tokyo, 19, No. 1, 37-46 (1969) (In Japanese with English synopsis)
Sport Fishery Abstracts 15, No. 3, Abstract No. 12456, p. 317 (1970)

Lipids were extracted from several tissues of native silver carp, Hypophthalmichthys molitrix, reared big heads, Aristichthys nobilis, and native and reared grass carp, Ctenopharyngodon idellus. Their fatty acid composition was analyzed by gas chromatography. The dorsal flesh contained 0.5-1.8% lipids in all fishes, and 87-108 mg% cholesterol in the big head, while 39-75 mg% of cholesterol in the others. The fatty acid composition of the dorsal flesh of the natives was almost the same, having 16:0, 16:1, 18:0, 18:1, 20:4, 20:5, and 22:6 acids as major components. The deposit lipids of the ventral flesh and abdominal and skull cavities of the grass carp showed different fatty acid composition than in the silver carp, having a higher content of 18:2 and 18:3 acids. In particular, oil in the skull cavities of three samples showed more than 20% of 18:3 acid. In analysis of the lipids of six samples of water plants, 18:2 and 18:3 acids were found in large amounts in their leaves. It is inferable that the high content of these acids in grass carp deposit lipids might come from their feed plants. A slight difference in fatty acid composition was observed between the native silver carp and the reared big head. Lipids of the reared grass carp were distinctly affected by the feed. In samples fed with marine fish (Decapterus lajang), 22:6 acid was found, 24.3-32.6% in the dorsal flesh, hepatopancreas and milt, while in the lipids of those given a commercial feed 22:6 acid amounted to 10.4-13.3% in the dorsal flesh and hepatopancreas, 7.2-8.6% in the milt and 14.6% in the eggs. The quality and quantity of the feed oil for parent fish seem to have an important role as regards the artificial offspring. (Authors synopsis) Reprinted

9.13 INFLUENCE OF BIOLOGICAL AND ENVIRONMENTAL FACTORS IN NITROGENOUS EXTRACTIVES OF THE SPURDOG SQUALUS ACANTHIAS

Vyncke, W. (Ministry of Agriculture, Fisheries Research Station, Stadhuis 8400 Ostend, Belgium)
Marine Biology 6, No. 3, 248-255 (July 1970) (International Journal on Life in Oceans and Coastal Waters, Springer-Verlag, Germany)

This article reports the results of a 3-year study of the influence of biological and environmental factors (sex, sexual maturity, feeding habits, and season) on the important nitrogenous extractives in the muscle tissue of the spurdog of the southern North Sea.

The average content of extractives was as follows (in mg./kg.): urea, 18,930; ammonia N, 196; trimethylamine oxide N, 2,010; creatine, 5,090; creatinine, 530; β-alanine, 160; arginine, 76; aspartic acid, 65; phenylalanine, 99; sarcosine, 520; serine, 69; taurine, 1,190; threonine, 190; valine, 50; proline, 990; hydroxyproline, 105; cysteine, 82; cystine, 94; choline, 43; betaine, 980; total nitrogen, 34,000; dry matter, 240,000.

Apparently the nutritional pattern of the spurdog is not influenced by sex, sexual maturity, or season. Immature spurdog contained significantly more α-amino nitrogen, α-alanine, glutamic acid, glycine, and leucine than did the mature fish. Higher amounts of peptides were found in the samples collected in the spring/summer period than in the autumn/winter period. When the data were compared with those of most bony fish, the nitrogenous extractives of the spurdog showed high amounts of urea, trimethylamine oxide, betaine, glycine, leucine, cysteine, cystine, proline, hydroxyproline, and sarcosine, and very low amounts of lysine and histidine. [5 tables, 61 references]

FTP

9.13 (9.17)(9.19) (1.37) ACTIVITY RESPONSE TO OXYGEN IN BROOK TROUT, SALVELINUS FONTINALIS (MITCHELL)

Dandy, J. W. T. (Department of Zoology, University of Manitoba, Winnipeg)
Canadian Journal of Zoology 48, No. 5, 1067-1072 (September 1970)

Several authors have reported that certain species of fish can select regions of high concentration in oxygen gradients. Hoglund (1961) and Jones (1952) concluded that the selection resulted from changes in random locomotory activity. To test this theory, to characterize the fish's response to oxygen, and to determine the threshold concentration of oxygen, the author devised an activity meter whereby he could measure activity changes in trout too slight to be perceptible to the eye. He chose trout as the test animals because so much is known about their metabolic responses to ambient oxygen levels. Three groups, consisting of nine trout each, were exposed to water (at 10° C.) containing 1.7, 6.0, or 8.0 p.p.m. oxygen. (Air-saturated water at that temperature contains 11.3 p.p.m. oxygen. Several investigators have reported that water containing from 1.4 to 2.0 p.p.m. oxygen is lethal to trout; Graham (1949) reported that the critical level for maximum activity is about 8.0 p.p.m.)

Exposure to water containing either 6.0 or 1.7 p.p.m. oxygen induced an activity response within minutes. This response reached a peak during the first hour, then slowly waned. Except during the second hour in 1.7 p.p.m. oxygen, when activity waned as death approached, the intensity of response throughout exposure was greater to the lower oxygen levels than to the higher levels. Not

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9.14 (1.122) THE FOOD OF BLUEFIN TUNA (THUNNUS THYNNUS) IN THE WESTERN NORTH ATLANTIC OCEAN

Dragovich, Alexander (Bureau of Commercial Fisheries Tropical Atlantic Biological Laboratory, Miami, Florida 33149)
Transactions of the American Fisheries Society 99, No. 4, 726-731 (October 1970)

The stomach contents of 250 bluefin tuna, Thunnus thynnus, captured in the western North Atlantic from 1965 to 1966 by longline, purse seine, and trolling, were analyzed quantitatively and qualitatively. A large percentage (65%) of stomachs were empty. The food of bluefin tuna consisted of 22 taxa of fish, 10 of mollusks, and 8 of crustaceans. Salps were also present. By volume, fishes accounted for 76.9% of the stomach contents; mollusks, 18.1%; crustaceans, 4.2%; and unidentified invertebrates and salps, 0.7%. All food organisms were pelagic. The data do not show a clear relation between size of tuna and size of food. Differences were marked between composition of forage found in deep-swimming tunas caught by longline and that in tunas caught at the surface by purse seine or trolling. [2 figures, 3 tables, 11 references] Author's abstract

9.14 (1.92)(9.16) THE AVAILABILITY TO POND FISHES OF THE AMINO ACIDS OF ARTIFICIAL FOODS. 1. AVAILABILITY TO TWO-YEAR-OLD CARP OF THE AMINO ACIDS OF BARLEY, PEAS, GROUNDNUTS AND A FEEDING MIXTURE

Shcherbina, M. A. (All-Union Research Institute for Pond Fisheries, VNIIPRKh)
Problems of Ichthyology 9, No. 6, 876-879 (1969)

Since the nutritional value of food rations is largely determined by protein quantity and quality, every fish farmer pays particular attention to the crude protein content of his fish's rations. "Quality" is usually defined in terms of amino-acid composition, great significance being attached to the concentration of the essential amino acids lysine, methionine, and tryptophan. By the law of the minimum, this definition limits the utilization of protein as a whole.

On the basis of a great number of experiments on farm animals, Grigor'yev (1966) established that the higher the biological value of the protein in food, the closer will its amino-acid composition correspond to the amino-acid requirements of the animal's body. A considerable amount of information has been accumulated on the amino-acid requirements of poultry and swine. When direct experimental data are lacking, the requirements are determined provisionally from the total amino-acid composition of the animal's body proteins. Since the author was unable to find any data on the amino-acid requirements of 2-yr.-old carp, he assessed them from the total amino-acid content of the fish, observing the precedent set in animal husbandry.

To determine the quantity of amino acids that the carp derive from their food--that is, the availability of the amino acids to the fish--he fed them four foods of plant origin: barley, peas, groundnut meal, and a mixture composed of groundnut meal

(over)

9.15 (9.16)(9.19) NEW THREATS TO CORAL REEFS

Loftas, Tony
New Scientist 48, No. 731, 559 (December 24, 1970)

Acanthaster planci, the Crown of Thorns starfish, is not the only peril to the world's coral reefs. Pollution and the green bubble alga Dictyosphaeria cabernosa are also killing off the corals and the rich animal life associated with them. In the southern third of Kaneohe Bay, Hawaii, the buildup of sewage discharged into the Bay has killed about 15 square miles of Poritas compressa, which built most of the reefs in the area. The situation is so bad that living specimens of the coral when placed in the water of the Bay, will die within a few weeks. In the middle part of the Bay, scuba divers have found large areas of dead and dying coral polyps covered in places to a depth of over a foot by a smothering mat of green bubble alga. The growth of this alga parallels the increased discharge of sewage and deposits of sediment into the Bay. (On one day, one of the ten streams in the area deposited in the Bay 10,000 tons of sediment washed from a number of new construction sites.) About 4 miles from Waikiki, 45,000,000 gal. of raw domestic sewage pours into Waikiki Bay every year. Extensive algal growth is evident in that area also.

Aside from their value as an amenity, coral reefs are the most biologically productive of all natural communities. They provide high quality protein and serve as a buffer against the ravages of the ocean, preserving thousands of miles of continental coastline. Once a coral reef has been destroyed, however, hope for its recovery is infinitesimal.

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(40%), linseed cake (10%), barley (22%), peas (10%), protein-vitamin concentrate (4%), macaroni waste (5%), fish meal (4%), grass meal (3%), and chalk (2%). Each food was fed as damp-pressed granules. Tables are given showing the amino-acid composition of each of the foods, the digestibility of the crude protein and the availability of the amino acids derived from each food, and the amount of available essential amino acids in each food compared with their total quantity in the body tissues of the 2-yr.-old carp.

The results show that data on the availability of the amino acids in food, related to a unit of lysine and compared with the amino-acid composition of the body, will help clarify which amino acids, and in what amounts, must be included in the food to achieve the required amino-acid balance and lower the expenditure of protein on a unit of fish growth.

[3 tables, 4 references]

LB

9.13 (9.17)(9.19)(1.37)

SCALES IN SEA

9.125 (9.6)(2.146)
Wheeler, Alwyne(reviewer)
Sounds of Western North Atlantic Fishes: A Reference File of Biological Underwater Sounds, xx + 207 pp. Johns Hopkins: Baltimore, Maryland (December 1970) 119s.
Marie Poland Fish and William H. Mowbray
Nature 229, No. 5281, 210 (January 15, 1971)

The sound-making capabilities of 220 species (59 families) of fish living along the Atlantic and Caribbean coasts of the United States are catalogued. The distribution, size, and biology of each species are mentioned, and the noises each produces in test tanks--and occasionally in the wild--are described. Accompanying the verbal descriptions are spectrograms and oscillograms of the sounds.

LB

9.14

THIAMINE DEFICIENCY SYMPTOMS EXPERIMENTALLY INDUCED IN THE EEL

Hashimoto, Yoshiro, Shigeru Arai, and Takeshi Nose (Laboratory of Marine Biochemistry, Faculty of Agriculture, The University of Tokyo, Bunkyo-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 8, 791-797 (August 1970)

Commercial dry feeds are now used in the culture of the eel, Anguilla japonica, one of Japan's most important cultured species. The vitamin composition of the diet has been largely based on information obtained in feeding salmonid fishes. The researchers, therefore, had begun a study of the vitamin requirements of the eel. This paper reports on the thiamine requirements. They found that the eel does require thiamine and exhibits deficiency symptoms when poor quality feeds are fed. These symptoms, characterized by poor growth, congestion or hemorrhage in the fin areas, ataxia, and flexion of the trunk, are described and illustrated.

[5 figures, 3 tables, 11 references]

FFP

9.15 (9.16)(9.19)

Recently, several marine scientists have suggested that coral lagoons could be used for fish and even whale farms. Fertilizers or nutrient-rich, deep-ocean water would be used to increase the productivity of these farms. The question now arises: Would this increased fertility be desirable? Would it produce more high quality protein or would it convert the lagoons into dead pools floored with a decaying mat of green bubble alga? Apparently the fish farm proponents did not consider the possible loss of coral formations as a direct result of enrichment of the water.

LB

9.12 (8.59)(1.53)

LACTATE DEHYDROGENASE ISOZYMES OF PACIFIC HAKE (MERLUCCIUS PRODUCTUS)

Utter, Fred M., H. O. Hodgins (Biol. Lab., Bur. Comm. Fish., Seattle, Washington)
Chemical Abstracts 72, No. 19, 96890a (May 11, 1970).

9.15 (9.16)(9.19)

Recently, several marine scientists have suggested that coral lagoons could be used for fish and even whale farms. Fertilizers or nutrient-rich, deep-ocean water would be used to increase the productivity of these farms. The question now arises: Would this increased fertility be desirable? Would it produce more high quality protein or would it convert the lagoons into dead pools floored with a decaying mat of green bubble alga? Apparently the fish farm proponents did not consider the possible loss of coral formations as a direct result of enrichment of the water.

LB

9.15 (1.93)

DIFFERENTIAL REACTIONS OF ATLANTIC AND PACIFIC PREDATORS TO SEA SNAKES

Rubinoff, I., and C. Kropach (Smithsonian Tropical Research Institute, Box 2072, Balboa, Canal Zone)
Nature 228, No. 5278, 1288-1290 (December 26, 1970)

Pelamis platurus, a venomous sea snake inhabiting the tropical and subtropical waters of the Pacific Ocean, is invariably rejected as food by predatory birds and fishes living in the Pacific. Rejection occurs no matter how hungry the predator or how cleverly the snake meat is disguised. Atlantic predatory fishes, on the other hand, attack and eat the snakes--with varying degrees of immunity. The authors hypothesize that the Pacific predators have developed visual, olfactory, and/or gustatory recognition cues that Atlantic predators have had no opportunity to develop. They speculate about ways in which Pelamis could colonize the Atlantic should a sea-level canal permit their transmigration there.

LB

[8 figures, 4 references]

9.16 (1.0141)

PONDFISH FARMING IN NORWAY, SURVEY OF THE SITUATION TODAY, AND AN EVALUATION OF SOME PROFITABILITY FACTORS

Berge, Leidolv
Norges Handelshoegskole, Bergen Samfunnsoekonomisk Institutt. Papers from the Institute of Economics, 579 pp. (1968) (In Norwegian)
Translated by the Office of Foreign Fisheries, Bureau of Commercial Fisheries, Washington, D.C., 122 pp. (November 1969). Translation available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. PB-193923T, microfiche 95¢; hard copy price on request.
U.S. Government Research & Development Reports 70, No. 21, 31 (November 10, 1970)

Contents: Pondfish farming in Norway; Pondfish farming in Denmark; Production of rainbow trout in Japan; Pondfish farming in Central Europe; Environmental requirements of rainbow trout and the natural conditions for rainbow trout rearing in Norway; The pondfish industry in Norway today; Risks in the pondfish industry; Production functions; Pricing for pondfish products; Pondfish farming as a subsidiary or large scale operation; Future of pondfish farming. Reprinted

9.17 (0.8) SYNTHETIC REEF ECOLOGICAL SYSTEM FOR LARGE BODIES OF WATER

Bromley, James E. (6121 Jasmine Road, Pensacola, Florida 32503) (pat.)
U.S. Patent 3,540,415 (November 17, 1970)

In many areas, the Continental Shelf and slope are devoid of outcroppings suitable for fish havens. In other areas, the kelp beds and coral reefs so attractive to fish are being destroyed by the steady onslaught of sea urchins and starfish. Although many materials have been tried as artificial reefs--hollow concrete blocks, field stones, old automobile bodies, concrete-weighted automobile tires--their high ratio of weight to effective volume (the free space within the structure that is accessible to the fish) makes installation costs economically impractical. This invention is designed to overcome this handicap. The inventor's general objective was to provide, in the open sea, a fully submerged synthetic reef that (1) would serve as the physical nucleus of a regional ecological system capable of sustaining stable fish colonies, and (2) would not interfere with periodic harvesting by such conventional commercial fishing techniques as angling, trawling, and seining.

The reef assembly consists of a perforated plastic sheet or a coarse mesh fabric to which are attached at intervals the ends of a number of long, buoyant, plastic ribbons (see figures 1 and 2 on the back of the card). It is loaded in rolls aboard a barge, whence it can be laid at a controlled rate in the chosen area. A tender ship equipped with a bin containing coarse cracked rock or other discrete weights follows the barge, discharging weights onto the assembly (figure 3). Eventually detritus from the surrounding water will help the weights anchor the reef to the sea floor. Several miles of reef strip can be laid in a day.

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9.19 MERCURY IN THE MARINE ENVIRONMENT

Klein, David H., and Edward D. Goldberg (Scripps Institution of Oceanography, La Jolla, California 92037)
Environmental Science & Technology 4, No. 9, 765-768 (September 1970)

The level of mercury in certain coastal marine organisms was several hundred times greater than that in comparable volumes of sea water. Sediments near sewer outfalls contained more mercury than similar sediments further removed. Mercury content of bottom sediments and organisms collected off La Jolla and Palos Verdes, California, is shown in the following table.
[3 figures, 1 table, 17 references]

Sample	Mercury content (dry basis) of samples collected off:	
	La Jolla	Palos Verdes
	p.p.m.	p.p.m.
Bottom sediment	0.02	0.3
Crab (Cancer anthonyi)	0.8	1.0 1.1
Whelk (Kelletia kelletia)	1.5 0.9 2.1	0.9
Rock scallop (Hinnites multirugosus)	0.7 1.6	1.0 0.6

FTP

9.19 (8.9) PESTICIDES IN SURFACE WATERS OF THE UNITED STATES--A 5-YEAR SUMMARY, 1964-68

Lichtenberg, James J., James W. Eichelberger, Ronald C. Dressman, and James E. Longbottom (Analytical Quality Control Laboratory, Federal Water Quality Administration, U.S. Department of the Interior, 1014 Broadway, Cincinnati, Ohio 45202)
Pesticides Monitoring Journal 4, No. 2, 71-86 (September 1970)

This paper summarizes the data of five annual general surveys (1964-68) for the presence of chlorinated hydrocarbon pesticides in surface waters throughout the United States. The purpose was to provide information that pollution control authorities could use to assess the degree of hazard that might be involved and to provide the required control. Samples were collected from about 100 stations. Data are presented on dieldrin, endrin, DDT, DDE, DDD, aldrin, heptachlor, heptachlor epoxide, lindane, BHC (1,2,3,4,5,6-hexachlorocyclohexane, mixed isomers), and chlordane.

The pesticides occur widely in surface waters throughout the United States. The total number of occurrences was greatest in 1966, then fell off significantly in 1967 and 1968. Dieldrin, DDT, DDE, and DDD were found most frequently. The maximum levels of these pesticides in surface water have not exceeded permissible limits as they relate to human intake directly from a domestic water supply; however, the levels often exceeded the environmental limit of 0.050 µg./liter recommended by the Federal Committee on Water Quality Criteria.
[2 figures, 8 tables, 9 references]

FTP

9.19 (0.4)(1.82) (2.3) ELIMINATION OF BACTERIA BY THE NORTHERN QUAHAUG (MERCENARIA MERCENARIA): ENVIRONMENTAL PARAMETERS SIGNIFICANT TO THE PROCESS

Heffernan, W. Paul and Victor J. Cabelli (U.S. Department of Health, Education and Welfare, Northeastern Water Hygiene Laboratory, Narragansett, Rhode Island 02882)
Journal of the Fisheries Research Canada of Canada 27, No. 9, 1569-1577 (September 1970)

It is known that bivalve molluscs can concentrate enteric microorganisms from their environmental polluted sea water. Conversely, polluted shellfish will markedly reduce their content of enteric microorganisms when placed in a sea water environment free of such organisms. This purification process has been applied commercially for cleansing shellfish taken from polluted waters. The present study examined the influence of various environmental factors on the ability of the northern quahog to cleanse itself of artificially accummulated Escherichia coli. The authors used the techniques described earlier by V. J. Cabelli, and W. P. Heffernan [Applied Microbiology 19, 239-244 (1970)] for the preparation of the E. coli cultures for contamination of the shellfish, the sources of sea water and quahogs, and the arrangement of the experimental flow-through system. The variables considered were: initial contamination level of the animal, and the temperature, salinity, flow rate, and turbidity of the environmental water.

When contaminated quahogs were placed in sea water free of E. coli for 48 to 72 hr., the elimination of the E. coli to low residual levels in the animals

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9.19 (8.9)

PESTICIDE RESIDUES IN CHANNEL CATFISH FROM NEBRASKA

Stucky, N. P. (Research Division, Nebraska Game and Parks Commission, Lincoln, Nebraska 68509)
Pesticides Monitoring Journal 4, No. 2, 62-66 (September 1970)

This study was part of a program to determine the statewide (Nebraska) extent of environmental contamination by pesticides. The basic objective of this particular work was to determine the levels of DDT (and its isomers and metabolites) and dieldrin in Nebraska watersheds using the catfish as the indicator organism. The channel catfish were collected during the summer of 1964. DDT and its metabolites (o,p'-DDT, p,p'-DDT, p,p'-DDD, and DDE) and dieldrin were determined in individual fat samples and composite blood samples from these fish. One hundred and seventy-eight fish from eighteen sites were collected.

The level of pesticides in the fat of the fish was consistently higher than in the blood. The general results are as follows:

Tissue sample from catfish	Pesticide residue content (range of averages in parts per million)	
	DDT	Dieldrin
Fat	2.2 to 92.2	0.1 to 6.7
Blood (composite sample)	0.01 to 0.16	0.01 to 0.07

[2 figures, 3 tables, 13 references]

9.19 (0.4)(1.82)(2.3)

depended upon the initial level of the bacteria in the quahogs (and, in effect, upon the level of the organism in the contaminating water). Extending the contamination interval (period of exposure of the shellfish to the contaminating microorganism) from 6 hr. to 14 days did not affect the ability of the quahogs to cleanse themselves of the bacteria that they accumulated. The optimum environmental conditions for the elimination of E. coli from contaminated quahogs were: temperature, 10°-20° C.; salinity, 21-30‰; sea water flow rate, >13 ml./min. per animal; turbidity, trace to 25 Jackson Turbidity Units. The effect of ambient temperature (or season) from which the animals were taken is vague, but there is a strong suggestion that animals taken during late fall, winter, or early spring from waters at temperatures below 10° C. do not eliminate the E. coli as readily as animals collected during the rest of the year (in waters of temperatures higher than 10° C.).

Because the time required to eliminate E. coli to a specified level depends upon the initial level of contamination of the quahogs, there must be a ceiling on the initial level of contamination if any depuration process is to be accomplished in a relatively short period (within 48 hr.). Further studies are being conducted to determine (1) the effect on the response of the quahog to chemical and physical stimuli and (2) the variability of response of individual animals. Results of those tests will be published later.

[5 figures, 1 table, 16 references] FTP

9.19 (9.13)(1.92) DISTRIBUTION STUDIES OF MERCURIC PESTICIDES IN QUAIL AND SOME FRESHWATER FISH

Backstrom, Jorgen (Dep. Pharmacol., Roy. Vet. Coll., Stockholm, Sweden)
Chemical Abstracts 73, No. 5, 24304k (August 3, 1970)

9.17 (0.8)

Reefs of this type have several advantages. Relative to the effective volume, the cost of materials, hauling, and installation is much lower than that of other systems. The assembly can be constructed to provide a wide variety of frond length, distribution, color, and configuration to suit particular ecological and hydraulic conditions. Since the fronds are virtually transparent to sonar, they produce negligible echo during fish-finding operations.

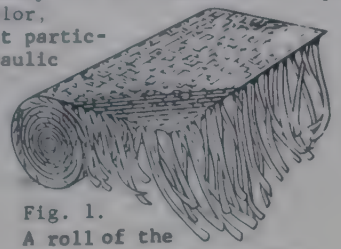

Fig. 1. A roll of the synthetic reef assembly

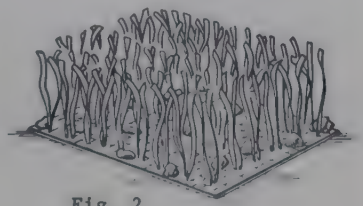

Fig. 2. An installed section of synthetic reef

Fig. 3. Installing the synthetic reef

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9.19 (1.85)

LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS

Naqvi, Syed M., and Denzel E. Ferguson (Department of Zoology, Mississippi State University, State College, Miss. 39762)
Transactions of the American Fisheries Society 99, No. 4, 696-699 (October 1970)

In 24-hr bioassays, fresh-water shrimp, Palaemonetes kadiakensis, from 3 areas of intensive pesticide use in the Mississippi delta were 1 to 25 times more resistant to 7 organochlorine, 3 organophosphorus, and 1 carbamate insecticides than shrimp from Noxubee National Wildlife Refuge (Bluff Lake). Although populations differed in amount of resistance, the relative toxicity of the insecticides was similar. Toxicity of the insecticides, ranked in descending order, was as follows: Most toxic, endrin, DDT, methyl parathion, parathion; medium toxicity, Guthion, lindane, toxaphene, Strobane; least toxic, chlordane, Sevin, and heptachlor. When caged in a canal near cotton fields, susceptible shrimp suffered 66% more mortality than did native, resistant shrimp.

[1 figure, 1 table, 12 references] Authors' abstract

9.19 (8.42) MERCURY AND METHYLMERCURY CONTENT IN FISH AND CRABS, NOVEMBER 1967-FEBRUARY 1969

Westoo, Gunnel, and Martanne Rydalv (Fodoamneshyg. Avd. Vitamined., Statens Inst., Folkhalsan, Stockholm, Sweden)
Chemical Abstracts 73, No. 9, 44026z (August 31, 1970)

9.19 ELIMINATION OF BACTERIA BY THE SOFT SHELL CLAM, MYA ARENARIA
(0.4)(1.82)
(2.3)

Cabelli, Victor J., and W. Paul Heffernan (U.S. Department of Health, Education and Welfare, Northeastern Water Hygiene Laboratory, Narragansett, Rhode Island 02882)
Journal of the Fisheries Research Board of Canada 27, No. 9, 1579-1587 (September 1970)

The purpose of this study was to determine the uptake and elimination of coliform organisms by the clam, to reexamine the influence of environmental factors on the depuration of bacteria by the clam, and to test the feasibility of recirculating and of flow-through depuration systems for the clam.

The accumulation of Escherichia coli by the soft shell clam followed the same pattern as that previously found for the northern quahog (Heffernan and Cabelli, 1970) in which the level reached was determined by the density in the environmental water. Most of the clams accumulated E. coli to some extent within 6 hr. (unlike the situation with the quahog) and the number of functioning clams (that is, those that accumulated the microorganisms beyond the level in the water) did not change significantly thereafter. The average accumulation factor (median level in animals/level in water) of 20 for the soft shell clams was about three times that for the quahogs. Apparently the clam achieves a steady state condition in which uptake and removal of the coliforms are balanced. For depuration of soft shell clams the lower limit of temperature is 10° C., of salinity is 20‰, and of flow rate of environmental water is 7 ml./min. per animal.

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9.19 METABOLIC EFFECTS OF POLYCHLORINATED BIPHENYLS IN THE AMERICAN KESTREL

Lincer, Jeffrey L., and David B. Peakall (Langmuir Laboratory, Section of Ecology and Systematics, Cornell University, Ithaca, New York 14850)
Nature 228, No. 5273, 783-784 (November 21, 1970)

Polychlorinated biphenyls (PCBs) are used as plastizers in plastics, resins, and chlorinated rubber; have been recommended for improving lindane residues; and are used to increase the insecticidal properties of DDT and dieldrin. Because the PCBs are highly stable, insoluble in water, and soluble in lipids, they can persist in and undergo biological concentration in the environment. Previous workers found that the PCBs widely distributed among wildlife and that the PCBs are toxic. The purpose of the present study was to examine the metabolic effects of PCBs in the American kestrel (falcon).

The kestrels were fed 0.5 or 5.0 p.p.m. of 'Aroclor 1254' or 'Aroclor 1262' (trade names for PCBs containing 54% chlorine and 62% chlorine, respectively) in their diet for 5 months. Histological examinations were carried out on the livers of the kestrels.

The researchers found that an in vitro breakdown of oestradiol to a more polar metabolite occurred in the livers of the kestrels to a degree depending upon the dose level of the PCBs. No apparent differences existed between the effects of the two PCBs. No conversion took place in the livers of the control (untreated) kestrels.

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9.19 SYSTEM STUDIES OF DDT TRANSPORT

Harrison, H. L., O. L. Loucks, J. W. Mitchell, D. F. Parkhurst, C. R. Tracy, D. G. Watts (University of Wisconsin, Madison), and V. J. Yannacone, Jr. (Environmental Law Section, American Trial Lawyers Association)
Science 170, No. 3957, 503-508 (October 30, 1970)

At hearings conducted by the State of Wisconsin Department of Natural Resources considering a petition to ban the use of DDT in the State, evidence was presented that included a description of the transport mechanisms of DDT, its chemical properties, its physiological effect on individual organisms, and its effect on whole populations. This article is a synthesis of material from several sources and describes a model for DDT transport. First, the authors developed a mechanistic model to describe the movement of DDT and DDE (breakdown product of DDT) in an inland ecosystem. Finally, they derive a mathematical model to indicate the dependence of population size in any tropic level upon the populations in adjacent levels and to provide a basis for predicting population changes attributable to DDT.

As a result of this analysis, the authors suggest that DDT concentrates in the higher trophic levels. Furthermore, even if no more DDT is added to the biosphere, the concentrations of DDT in certain long-lived species in the higher trophic levels could, depending on unknown rates of metabolic breakdown, continue to rise for some years.

In any trophic level, DDT can have three major consequences depending upon the concentration level of the insecticide: (1) The concentration of DDT may be

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9.19 SIGNIFICANCE OF DDT RESIDUES FROM THE ESTUARY
(8.9) NEAR PENSACOLA, FLA.

Hansen, David J., and Alfred J. Wilson, Jr. (Bureau of Commercial Fisheries Center for Estuarine and Menhaden Research, Pesticide Field Station, Gulf Breeze, Florida 32561)
Pesticides Monitoring Journal 4, No. 2, 51-56 (September 1970)

The researchers determined the amount of organochlorine pesticide residues in fish (Pelagic species: pinfish, croaker. Nonpelagic species: pigfish, silver perch, spot.) from the estuary near Pensacola, Florida, from April 1964 to November 1965. Also, they determined the rates of storage and retention of DDT in fish held under laboratory conditions.

The pesticide content of the fish rarely was higher than 0.1 p.p.m. (whole fish basis) except in those collected from the lower estuary in the summer and fall when the amount of DDT and its metabolites reached 1.3 p.p.m.

In the laboratory test, the fish were exposed to 0.1 p.p.b. of p,p'-DDT for 5 weeks. The DDT level in the fish increased up to the second week and remained nearly constant up to the end of the test period. The maximum concentrations in the fish were 38,000 times that in the test water. After the treated fish were held in pesticide-free water for 8 weeks, they lost 78 to 87% of their DDT. The level of DDD and DDE in the fish did not change either during exposure to DDT or during the flushing period (held in pesticide-free water for 8 weeks).
[1 figure, 2 tables, 6 references]

FTP

high enough to kill the members of that level. (2) The concentration may be high enough to cause sublethal effects. If the effect involves reproductive failure, then the trophic level will disappear even though the dosage is not lethal. (3) The level of DDT may not have any apparent effect and, in this case, the DDT level will pass on to the next higher trophic level, which will then be subjected to the same three consequences.

The time necessary for DDT to reach equilibrium in an ecosystem after its introduction depends upon the life spans in the trophic structure and the age distributions. The top carnivores play an important role in stabilizing the system and they may take a long time to respond to the input of DDT. Furthermore, because DDT is reducing predators in present ecosystems, new population explosions may arise.

After the loss of one species, the ecosystems making up the world biosphere might restabilize with different population levels of the remaining species. But, basic changes in population levels may have serious economic consequences. Also, the DDT that once appeared in the population that was destroyed would then be concentrated into fewer remaining species. Whether or not this process could be repeated in a series cannot, according to the authors, be predicted at this time. However, they do predict, on the basis of the models they presented, that the consequence of the present worldwide inputs of DDT in the environment will not become apparent for many years. [2 figures, 32 references] FTP

Jernelov, Arne (Inst. Vatten Luftvardforsk., Stockholm, Sweden)
Chemical Abstracts 73, No. 5, 23633e (August 3, 1970)

9.19 MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON

Harriss, Robert C., David B. White, and Robert B. MacFarlane (Department of Oceanography, Florida State University, Tallahassee 32306)
Science 170, No. 3959, 736-737 (November 13, 1970)

The authors state that the present water-quality standards for mercury are inadequate to protect phytoplankton--the basic elements of almost all aquatic food chains. [The U.S. Public Health Service has tentatively adopted a standard of 5 p.p.b. for mercury in drinking water.] The experiments reported in this article were designed to evaluate the acute effects of four commonly used organomercurial fungicides on the marine diatom Nitzschia delicatissima and a naturally occurring phytoplankton population taken from a fresh-water lake. In laboratory tests, the phytoplankton were exposed to the following organomercurial compounds at 1, 10, and 50 p.p.b.: phenylmercuric acetate; methylmercury dicyandiamide; N-methylmercuric-1,2,3,6-tetrahydro-3,6-methano-3,4,5,6,7,7-hexachlorophthalimide; and diphenylmercury.

Diphenylmercury was the least toxic of the four tested. The other three showed significant reduction in photosynthesis and growth in the phytoplankton at the 1 p.p.b. level. At 50 p.p.b. of the fungicides, all uptake of organic carbon is stopped, and cell counts indicated complete inhibition of growth.

The authors conclude that some marine and fresh-water phytoplankton are sensitive to lower concentrations of organomercurial fungicides than that concentration affecting fish in short-term tests. Furthermore, mercurial compounds in concentrations far below the level proposed in the water quality standards have detrimental effects on phytoplankton. The authors suggest that the use of organomercurial compounds in any way that permits their discharge into natural waters should be stopped as soon as possible. Also, the long-term effects of mercury levels lower than 1 p.p.b. should be determined to establish adequate water quality standards. [2 figures, 5 references] FTP

9.19 (0.4)(1.82)(2.3)

Consistently good elimination of elevated temperature coliforms to low levels was obtained by a flow-through depuration system if the initial level of contamination of the soft shell clams was not over about 2,000 elevated temperature coliforms per 100 g. Comparable results were obtained with the recirculating depuration system suggesting that this system may be feasible for the depuration of marginally polluted clams. [6 figures, 1 table, 12 references] FTP

Johnson, Donald W., and Sam Lew (Zoology Department, Arizona State University, Tempe, Arizona 85281)
Pesticides Monitoring Journal 4, No. 2, 57-61 (September 1970)

This paper contains data on the chlorinated hydrocarbon (pesticide) residues in fishes of the lower Colorado River Basin. The species examined were carp, channel catfish, green sunfish, threadfin shad, tilapia, and suckers (Sonoran and Gila). The concentrations of the residues in the fish were mostly in the parts per billion level. However, DDT and metabolites were found to be 187.5 p.p.m. Dieldrin was also found in significant concentrations. DDE was the principal residue. Toxaphene was frequently found in the fish and at levels up to 172.9 p.p.m. FTP
[1 figure, 1 table, 8 references]

Marx, Leo (Amherst College, Amherst, Massachusetts)
Science 170, No. 3961, 945-952 (November 27, 1970)

The author suggests the striking convergence of the literary view and the ecological view of America's dominant institutions. What confronts us, he says, is an extreme imbalance between society's hunger--the rapidly growing sum of human wants--and the limited capacities of the earth. He proposes that the American Association for the Advancement of Science establish a panel of the best qualified scientists, representing as many as possible of the disciplines involved, to serve as a national review board for ecological information. FTP
[15 references]

9.19

The authors indicate, therefore, that this increase in hepatic enzyme activity is correlated with an increase in cytoplasmic RNA. Other workers noted proliferation of the endoplasmic reticulum of rat liver cells following the administration of chlordane (Fouts and Rogers, 1964) and DDT (Ortega, 1966). The authors conclude that their present findings suggest that the physiological actions of polychlorinated biphenyls are similar to those of DDT and its metabolites. They recommend, therefore, that this industrial contaminant (PCB) should be considered as an additional burden to the ecosystem comparable with that imposed by the organochlorine pesticides.
[1 table, 14 references] FTP

9.19 SOURCE OF POLYCHLORINATED BIPHENYL CONTAMINATION IN THE MARINE ENVIRONMENT

Holden, A. V. (Freshwater Fisheries Laboratory, Pitlochry, Scotland)
Nature 228, No. 5277, 1220-1221 (December 19, 1970)

In an effort to determine the source of the polychlorinated biphenyls (PCBs) that contaminate Scottish waters, the author sampled the water surface film and the subsurface water at 2-mile intervals along the Clyde. Using a procedure having a limit of detection in water of 0.00001 p.p.m., he found no PCB residues in the water and no significant amounts in samples of effluents discharged from trunk sewers in the Glasgow area. PCB concentrations in the zooplankton were <0.03 p.p.m. (wet weight); in clupeoid fish, as much as 2.6 p.p.m. (wet weight).

Since industrial effluent is treated along with domestic sewage in Glasgow, he also sampled the crude sewage sludge that is dumped at a rate of about 1,000,000 tons a year in deep water in the Firth of Clyde. With a PCB mixture containing about 50% by weight of chlorine as a reference, he found that the concentrations of PCBs in 15 samples of the crude sludge ranged from <0.1 to 14 p.p.m. An average concentration of PCBs on the order of 1 p.p.m. would be equivalent to a discharge into the Clyde estuary of about 1 ton of PCBs a year. Samples of crude sludge dumped into the Northern Irish Sea from the Manchester treatment plant contained between 0.1 and 5 p.p.m. PCBs. If sludge is dumped there at a rate of half a million tons a year, an average concentration of 2 p.p.m. PCBs would make for a discharge of about 1 ton of PCB isomers a year. The 5 million

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9.2 SURVEY OF PURCHASES OF FISH PRODUCTS BY HOUSEHOLDS

Nash, Darrel A. (Division of Economic Research, Bureau of Commercial Fisheries, College Park, Maryland)
U.S. Government Research and Development Reports 70, No. 22, 20 (November 25, 1970)

The domestic use of seven fish products was surveyed and the findings recorded on tapes. Each tape contains complete records of the product purchased by participating households surveyed over the period February 1969 through January 1970. Each two week survey was done from a continuing panel of 1,500; those remaining in the survey 6 months or more (1,043 households) are included in this tape. Purchases are identified as to species, product and preservation form, cost of each purchase, and weight (or as to product, number of meals, and whether it was main dish). Each household is identified by household income, per capita income, religion, race, family size, U.S. Census geographic division of residence, age of household head, education of household head, occupation of household head, whether husband or wife is household head, and age-sex structure of the children. The data are used originally in econometric analysis to isolate the determinants of fish purchases and expenditures. The data can be used to segment the market to determine which population groups purchase the various fish products.

When ordering specify tape recording mode desired: 7 or 9 track, 556 or 800 BPI and odd or even parity. (Note: 9 track is available only in 800 BPI odd parity.) Tapes cost $55.00 each and are available from the National Technical Information Service, Operations Division, Springfield, Virginia 22151. Order a specific tape by affixing the subtitle of the survey to the title of the general survey (general title is at the top of this card). Subtitles are:

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9.19 COMPARATIVE METABOLISM OF METHOXYCHLOR, METHIOCHLOR, AND DDT IN MOUSE, INSECTS, AND IN A MODEL ECOSYSTEM

Kapoor, Inder P., Robert L. Metcalf (Department of Zoology, University of Illinois, Urbana, Ill. 61801), Robert J. Nystrom, and Gurcharan K. Sangha
Journal of Agricultural and Food Chemistry 18, No. 6, 1145-1152 (November-December 1970)

The authors point out that there are many reasons to regard DDT as an undesirable environmental pollutant but, at the same time, DDT has saved more lives and averted more illness than perhaps any other substance invented by man (through its properties as a persistent insecticide in the control of the insect vectors of malaria, typhus, plague, and other diseases, and of other noxious insects). But, they say, a need exists for the prompt replacement of DDT in many insect control programs by a persistent but biodegradable substitute. Methoxychlor [2,2-bis (p-methoxyphenyl)-1,1,1-trichloroethane] appears to be a likely replacement, but little information is available on its biological fate. Also, the authors, in their search for biodegradable analogues of DDT, have studied methiochlor [2,2-bis(p-methylthiophenyl)-1,1,1-trichloroethane]. The purpose of this study was to examine the comparative metabolic pathways of methoxychlor, methiochlor, and DDT [1,1,1-trichloro-2,2-bis(p-chlorophenyl)-ethane] in mice, insects, and a model ecosystem. The model ecosystem was developed in the authors' laboratory and is briefly described in this paper--a full account of the model ecosystem technique will be published later.

Twenty-four hours after oral adminstration of radiolabeled compounds to the mouse, 98.3% of the methoxychlor, 47.11% of the methiochlor, and 1.02% of the

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9.4 FISHERIES SERVICE WILL BROADEN OUTLOOK ON MARINE RESOURCES

Coffey, Burton T.
National Fisherman 51, No. 8, 3A, 27A (December 1970)

In a telephone interview with the author (who is assistant editor of National Fisherman), the director of the National Marine Fisheries Service described some of the goals and future programs of NMFS. The new agency will be oriented not only to commercial fishing but to marine (as distinguished from fresh water) sports fishing and to other ocean interests. One of its immediate concerns is a policy that can be presented at the International Law of the Sea Conference to be held in 1972. One part of the policy will involve a 200-mile U.S. fishing zone.

One of the more interesting programs being developed is titled Marine Resources Monitoring, Assessment and Prediction (Marmap). It is a nationwide program to manage fisheries and to assess living marine resources in three areas of the oceans around the United States: the deep waters off the Continental Shelf, the waters on the edge of the shelf, and the waters of the shelf itself. Assessment intensity is expected to vary inversely with the distance from shore. Major surveys will be concerned with ichthyoplankton; once underway, they should provide resource data to the fishing industry almost immediately. The mapping part of the program will be conducted by sonar and by satellite. As an environmental data center, Marmap not only will survey marine resources but will monitor the concentrations of pesticides and heavy metals in U.S. coastal waters. LB

9.19

DDT were eliminated. In the mice and in the insects, methoxychlor was metabolized by O-demethylation to form 2-(p-hydroxyphenyl)-2-(p-methoxyphenyl)-1,1,1-trichloroethane and 2,2-bis-(p-hydroxyphenyl)-1,1,1-trichloroethane (eliminated largely in the conjugated form). In the model ecosystem, the fish (at the top of the food chain) contained 1,500 times more methoxychlor than did the water and 90,000 times more DDT. The elimination of methoxychlor was in dynamic equilibrium; DDT, DDE, and DDD were in a storage state in the fish.

In the mice and insects the methiochlor was metabolized by oxidation to 2-(p-methylsulfinylphenyl)-2(p-methythiophenyl)-1,1,1-trichloroethane and by further oxidation to the corresponding bis-sulfoxide and bis-sulfone. In the model ecosystem, the fish contained only traces of methiochlor with an eightfold concentration of its metabolite 2,2-bis(p-methylsulfinylphenyl)-1,1,1-trichloroethane. Methoxychlor is stored in snails in large quantities and the organism appears unable to metabolize the compound rapidly. In mammals, O-dealkylation in the liver appears to be the major pathway for methoxychlor metabolism.
[2 figures, 6 tables, 30 references]

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9.19 QUANTITATIVE ASSAY OF THE MINIMUM CONCENTRATION OF KRAFT MILL EFFLUENTS WHICH AFFECT FISH RESPIRATION (9.12)

Walden, C. Craig, T. E. Howard, and G. C. Froud (British Columbia Res., Vancouver, British Columbia, Canada)
Chemical Abstracts 73, No. 14, 69623e (October 5, 1970)

9.19

tons of London sewage sludge dumped every year off the Thames Estuary, though containing only about 0.2 p.p.m. PCBs, make for an equivalent of about 1 ton of PCB isomers.

Where sewage sludge is disposed of by dumping into marine waters, the possibility of PCB contamination is clearly possible. Where domestic sewage and industrial wastes are discharged directly into the sea without being treated, the PCBs could enter the ecosystem adsorbed to suspended solids. And where sewage sludge is disposed of on land, as many inland municipalities do, PCB residues can be introduced into the terrestrial ecosystem by transfer through the food chain.
[1 table, 9 references]

LB

9.6 INTERNATIONAL LIST OF PERIODICAL TITLE WORD ABBREVIATIONS

Sponsored by UNESCO (United Nations Education, Scientific and Cultural Organization) and the International Council of Scientific Unions (1970) Available from ICSU AB Secretariat, 17 rue Mirabeau, 75-Paris 16e, France.

Residents of North America and South America may obtain copies from Chemical Abstracts Service, Marketing Department, University Post Office, Columbus, Ohio, 43210, United States of America. Price US$4.50 plus mailing charges.

The List contains over 7,000 words or word roots with their recommended abbreviations.

FTP

9.7 COMMUNICATION IN THE PHYSICAL AND THE SOCIAL SCIENCES

Garvey, William D., Nan Lin, and Carnot E. Nelson (Center for Research in Scientific Communication, The Johns Hopkins University, Baltimore, Maryland)
Science 170, No. 3963, 1166-1173 (December 11, 1970)

Although the communications systems are composed of similar elements and structured similarly, the processes of disseminating and assimilating information differ markedly in the physical sciences and the social sciences. The scientific communication in the social sciences appears to be in an early stage of development (relative to that in the physical sciences). The elements of the communication structure of the social sciences are relatively noncohesive; the flow of scientific information through the communication system follows less predictable sequences for the social sciences than that for the physical sciences; and the processing of information for the archives appears less efficient for the social sciences. The social scientists appear to communicate more randomly than do the physical scientists.

In conclusion, the authors suggest that planners of innovation in scientific communication may be misled by the gross similarities of the scientific communication process for most disciplines. These similarities, they say, can mask some important differences between disciplines, and communication innovations designed for one discipline may be inappropriate for another.
[5 figures, 2 references]

FTP

9.2

Fresh and Frozen Shellfish, order No. PB-194346; Canned Salmon, order No. PB-194347; Fresh and Frozen Finfish, order No. PB-194348; Canned Tuna, order No. PB-194349; Canned Sardines, order No. 194350; Fish Meals Away From Home, order No. PB-194351; and Miscellaneous Canned Fish or Shellfish, order No. PB-194352.

From the author's summaries

9.2 YEARBOOK OF FISHERY STATISTICS

Food and Agriculture Organization of the United Nations, Vol. 28, xix + 324 pp. (1969) (Published 1970) Department of Fisheries, Rome, Italy, Price $7.50; £2.80; FF35.00.

This volume covers data on quantities and values of fish caught and landed by countries, by species, and by fishing areas. Copies may be obtained from the appointed sales agents and book sellers for FAO publications in the various countries or from the Distribution and Sales Section, FAO, Via delle Terme di Caracalla, 00100 Rome, Italy.

FTP

0.6 OILSEED PROTEINS. PRESENT UTILIZATION PATTERNS

Wilding, M. D. (Research and Development Center, Swift & Company, Oak Brook, Illinois)
Journal of the American Oil Chemists' Society 47, No. 10, 398-401 (October 1970)

In this article the author briefly reviews the patterns of use of the protein from soybeans. The author predicts that the future of our nation, along with many others of the world, will depend upon the technological food developments from vegetable protein sources of which the soybean will play a major role.

Soybean production in the United States went from about 5 million bushels in 1926 to over 1,000 million bushels in 1968. Apparently, more protein is produced from soybeans than from any other crop. The specific subjects considered in the review are: the efficiencies of protein conversion from some of the major protein sources; the advantages of soy as a protein food; preparation of soy protein concentrates and products (edible protein fibers, textured soy products, soy flour, vegetable spreads, beverage products).

The author believes that the present utilization patterns of oilseed proteins are but symbols of what is to come. [3 figures, 3 tables, 10 references] FTP

3.4 PHENOLIC COMPONENTS OF SMOKED MEAT PRODUCTS

Lustre, Alicia O., and Phillip Issenberg (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Mass. 02139)
Journal of Agricultural and Food Chemistry 18, No. 6, 1056-1060 (November-December 1970)

The purpose of this study was to determine which of the phenolic components of hardwood sawdust smoke could be recovered from a model food smoked in the laboratory and from a product commercially smoked. Uncured pork belly strips were smoked in the laboratory. The commercial product was a smoked summer sausage.

The phenolic fraction isolated from both products contained 4-methylguaiacol, phenol, 4-ethylguaiacol, m- and p-cresol, cis- and trans-isoeugenol, syringol, 2,6-dimethoxy-4-allylphenol, vanillin, acetovanillone, and cyclotene. Eugenol, 4-vinylguaiacol, syringaldehyde, acetosyringone, and maltol were found in the smoked pork belly strips but were not found in the summer sausage. Coniferaldehyde and sinapaldehyde (two major phenolic components of hardwood smoke) were not recovered from the smoked pork belly, apparently indicating a reaction of these compounds with the components of the meat. The authors found that about 50% of the recovered phenols were para-substituted and would not be determined by conventional colorimetric methods. [4 figures, 2 tables, 12 references] FTP

2.06 (1.89) SEA URCHINS -- NEW INDUSTRY FOR TOFINO

Hudnall, James
Western Fisheries 81, No. 3, 16, 18 (December 1970)

Sea urchins, which are quite common along the coast of British Columbia, now support a thriving export industry. They are harvested by scuba divers, who use specially devised rakes to transfer the live animals from the sea floor into cages. When the desired number of cages are filled, the still live urchins are taken to a processing plant in Tofino (Vancouver Island), sliced open with large knives, and their roes separated from shells and spines. Extreme care is taken to avoid damaging the roe, for appearance is an important market factor. The clean roes are packed in shallow wooden boxes (3.5×6.5×0.5 in.) and air freighted, raw and unrefrigerated, to Tokyo, where they bring about $3 a box.

To prevent complete exhaustion of British Columbia's sea-urchin supply (as has happened in Japan), the owner of the diving firm that harvests the echinoderms has proposed regulations governing collection. Kelp holdfasts are one of the animal's main foods; therefore nearly all sea urchin populations are located in and around kelp beds. If divers are restricted from entering the kelp, a core breeding population will always be at hand to ensure a plentiful supply of urchins indefinitely. [4 photographs] LB

9.1 EFFECTS OF SALTS AND pH ON FISH CHEMORECEPTOR RESPONSES

Hidaka, I. (Faculty of Fisheries, Mie Prefectural University, Tsu, Mie Prefecture, Japan)
Nature 228, No. 5276, 1102-1103 (December 12, 1970)

Earlier work has shown that pH affects the taste response to salt and to other taste stimuli in certain animal species. Furthermore, certain researchers have suggested that pH dependent receptors exist for NaCl--in the case of the rat the response to NaCl appears to be inhibited below pH 3. In this article, the author shows that addition of NaCl or other salts in very small amounts to HCl solutions increases the response of carp (Cyprinus carpio) palatal chemoreceptors.

In the experiments reported, the summated responses of multifiber strands of the palatal chemoreceptors were recorded from 11 preparations using a technique described by I. Hidaka and S. Yokota [Jap. J. Physiol. 17, 652 (1967)]. The stimuli used were solutions containing 0.05 M NaCl and varying concentrations of HCl. Also, the effect of $CaCl_2$ in varying concentrations of HCl was investigated.

The results suggested that the enhancement of the response of carp palatal chemoreceptors by NaCl (NaCl by itself showed very weak stimulative effectiveness over the concentration range used) may be related to the activity of the acid receptor rather than to the salt receptor.

Similar enhancements were obtained with several chloride salts having different monovalent or divalent cations and sodium salts of different monovalent anions. Na_2SO_4 and $MgSO_4$ did not enhance the response over the range of concentration of HCl of from 0.0005M to 0.01M. [2 figures, 1 table, 12 references] FTP

C.F.T.R.I.
FISH TECHNOLOGY EXPERIMENT STATION

SUBJECT INDEX

Subject	Page	Code
ANALYSIS, GENERAL		
...Glutamic Acid and Antiacids...Chick Bioassay of Protein Quality...	23	7.51
Elimination of the "pH Effect" in Cell Fragility Determinations	25	7.89
The Analysis of Pesticide Residues: New Problems and Methods	26	7.9
ANALYSIS, INORGANIC		
...Trace Metals...Determination by Atomic Absorption Spectrophotometry	24	7.42
Determination of Mercury in Water and Sediment Samples...	24	7.42
ANALYSIS, ORGANIC		
Intensity of Streaming Birefringence and Sedimentation of KCl Extracts of Fish Meat	23	7.51
...Removing or Solubilizing Proteins in Biologic Fluids	23	7.51
...Microestimation of Proteins...on PVC Ultrafilters	24	7.51
Estimation of Lysine and Sulfur Amino Acids...	25	7.523
APPARATUS AND EQUIPMENT		
(Conveyor) Saniveyor Food Quality Belting	6	0.12
AUTHOR INDEX	40	
BACTERIOLOGY		
...Estimating the Presence of Clostridium perfringens in Food	3	0.5
One-Day Fluorescent-Antibody Procedure for...Salmonellae in...Foods	3	0.5
Cell Walls of Pseudomonas Species Sensitive to [EDTA]	4	0.5
BIOCHEMISTRY AND METABOLISM OF FISH		
Histidine Metabolism in Fish--V. ...Protein-Deficiency and Fasting...	27	9.13
...Respiratory Metabolism, Oxygen Content, and Temperature in Fish	27	9.13
...Biological...Factors in Nitrogenous Extractives of the Spurdog...	28	9.13
Activity Response to Oxygen in Brook Trout...	29	9.13
BYPRODUCTS, MISCELLANEOUS		
[Method of Producing a Food Based on Fish] (pat.)	20	6.54
Enzymatic Modification of Proteins in Foodstuffs		
Part I. Enzymatic Proteolysis and Plastein Synthesis...	21	6.54
Part III. ...Plastein Synthesis From Peptic Hydrolyzate of Soy Protein	21	6.54
Part II. Nutritive Properties of Soy Plastein...	22	6.54
Part IV. ...Debittering of Peptic Proteolyzate with α-Chymotrypsin	22	6.54
Stabilization of Raw Protein From Fish... (pat.)	22	6.54
Disposal of Wastewater in Kamaboko Industry. I. Removal of Protein...	23	6.54
Yellow Pigments of Pearl.		
Part I. Carotenoid Pigment in Yellow Nacre	23	6.81
Part II. HCl-Methanol Soluble Yellow Pigments	23	6.81
...Low Temperature...Extraction...for Protein Concentrate Production	24	6.54
Japanese Produce Liquid Protein From Antarctic Krill	24	6.54
Manufacturing...Kamaboko Using Pollack...Influence of pH...	24	6.54
CANNED FISH, PROCESSING		
[Basic Principles of...Operation...of Autoclaves]	16	3.33
Electrical Processing of Marine Products (pat.)	17	3.330
Blueing of Processed Crab Meat. I. ...Processing Procedures...	17	3.3344
[Physicomechanical Tests of the Impermeability of Tin Cans]	18	3.336
...Formulas for...Estimation of Transient Temperature of Food...	18	3.337
CHEMISTRY AND BIOCHEMISTRY		
Volatile Neutral Compounds From Heat-Degradated Pork Fat...	1	0.31
Estrogenic Activity of DDT Analogs and Polychlorinated Biphenyls	1	0.35
Protein-Deficient Diet and Diuron Toxicity	1	0.35
Natural α-Radioactivity...in Bone and Liver From Various Animal Species	1	0.39
Journal of Bioenergetics	2	0.35
On Chitinolytic Activities in the Digestive Tracts...of Fishes...	2	0.38
Haemagglutination...Reactions of Extracts From Snails and Sponges. I. ..	3	0.39
COMPOSITION, INORGANIC		
Selenium Content of Foods	25	8.42
COMPOSITION, ORGANIC		
Nutrient Content of Offal...From Some Freshwater Fish...	25	8.0
...Amino Acid Pools of Some Cestodes of Elasmobranch Fishes...	26	8.51
...Properties of Eel Anti-Human Blood-Group H(O) 7S Globulin	27	8.51
...Fatty Acid Compositions of the Native and Reared...Carps...	28	8.53
FROZEN FISH, CHANGES IN DURING COLD STORAGE		
...the Ultrastructure of Frozen Stored Cod Muscle	17	3.2495
FROZEN FISH, PROCESSING		
Effect of Technological Processing on the Food Value of Mussels	18	3.23
GEAR, FISHING		
Weathering of Plasticized Poly(vinyl Chloride)	9	2.1111
Double Leadline Purse Seines Boost Catching Power	9	2.1125
Collapsible Lobster Trap (pat.)	10	2.1128
HANDLING FRESH FISH		
Notes on Fish and Shellfish	8	2.3
Apparatus for Dressing Fish (pat.)	12	2.3
Apparatus for Peeling Shrimp (pat.)	12	2.3
Fish Orienter (pat.)	13	2.3
Machine Separation of Edible Flesh from Fish	13	2.3
MARINE PLANT PRODUCTS		
Studies on the Components of Naga-Kombu, Laminaria longissima--I. ...	19	6.32
Variations in Phosphorus Uptake by Algae	19	6.34
Sterols of Red Algae	20	6.32
NEW PRODUCT		
Sea Urchins -- New Industry for Tofino	37	2.06
NORTH AMERICAN FISHERIES, U.S., INLAND		
The Sea Lamprey in the Great Lakes	7	1.0118
Species Interactions of the Alewife in the Great Lakes	8	1.0118
NUTRITION AND MEDICINE, GENERAL		
Sea Snake Venom Structure Probed	3	0.4
International Research: Its Role in Environmental Biology	4	0.4
NUTRITIONAL VALUE OF FISHERY BYPRODUCTS OTHER THAN MEAL		
Availability of Fluoride From Fish Protein Concentrate...	20	6.54
OILS, CHEMICAL AND PHYSICAL PROPERTIES		
Effect of Feeding Cod Liver Oil on the Fate of Radiotocopherol in Sheep	17	4.15
Topics in Lipid Chemistry	18	4.0
OILS, UTILIZATION AND MARKETING		
Tests Find New Use for Fish Oil	20	4.85
PACKAGING		
Sheet Material for Deoxygenated Food Packages (pat.)	14	3.2383
PARASITES AND PREDATORS		
New Threats to Coral Reefs	29	9.15
PERIODICALS AND BOOKS		
International List of Periodical Title Word Abbreviations	36	9.6
POLLUTION		
Bacterial Degradation of Diphenylmethane, a DDT Model Substrate	4	0.5
Mercury in the Marine Environment	31	9.19
Pesticides in Surface Waters of the United States...1964-68	31	9.19
Distribution...of Mercuric Pesticides in...Freshwater Fish	32	9.19
Levels of Insecticide Resistance in Fresh-Water Shrimp...	32	9.19
Mercury and Methylmercury Content in Fish and Crabs...	32	9.19
Pesticide Residues in Channel Catfish From Nebraska	32	9.19
Metabolic Effects of Polychlorinated Biphenyls in the American Kestrel	33	9.19
Significance of DDT Residues From the Estuary Near Pensacola, Fla.	33	9.19
Systems Studies of DDT Transport	33	9.19
American Institutions and Ecological Ideals	34	9.19
Chlorinated Hydrocarbon Pesticides in...Fishes of Southern Arizona	34	9.19
Conversion of Mercury Compounds	34	9.19
Mercury Compounds Reduce Photosynthesis by Plankton	34	9.19
Comparative Metabolism of Methoxychlor, Methiochlor, and DDT...	35	9.19
...Polychlorinated Biphenyl Contamination in the Marine Environment	35	9.19
...Minimum Concentrations of Kraft Mill Effluents Which Affect Fish...	36	9.19
PRESERVATION, IRRADIATION		
Effect of Irradiation of Anisakis Larvae in Salted Herring	13	3.15
Elimination of Harmful Organisms From Food and Feed by Irradiation	13	3.15
Radiation Preservation of Fish. II. Trout	13	3.15

CONSERVATION
Synthetic Reef Ecological System for Large Bodies of Water 31 9.17
CRAB
Carapace Width-Total Weight Relation of Blue Crabs... 8 1.86
DISEASES AND POISONS OF FISH
...Reactions of Atlantic and Pacific Predators to Sea Snakes 30 9.15
ECONOMICS AND STATISTICS
Survey of Purchases of Fish Products by Household 35 9.2
Yearbook of Fishery Statistics 36 9.2
ENGINEERING
Bridging the Environmental Abyss. Part 3: Waste Treatment... 5 0.8
[Cryogenics] for Student and Specialist
Advances in Cryogenic Engineering Vol. 15 5 0.8
Cryogenic Laboratory Equipment 5 0.8
Cryogenics and Refrigeration--A Bibliographical Guide--Vol. 2 6 0.8
Syncrolift Dry Dock Systems for S.A. Fish Harbours 11 2.2
EXPLORATORY FISHING
...R/V Choco Cruise to Providencia Island... 11 2.12
Collecting Coastal Pelagic Fishes With Artificial Light... 12 2.12
...Cruises 6901-6906 of the Chartered Shrimper "Cacique" 12 2.12
FISH CULTURE
The Availability to Pond Fishes of the Amino Acids of Artificial Foods... 29 9.14
The Food of Bluefin Tuna... 29 9.14
Thiamine Deficiency Symptoms Experimentally Induced in the Eel 30 9.14
Pondfish Farming in Norway... 30 9.16
FISH MEAL AND OIL, MANUFACTURE
[Preliminary Report on Flour From Spiny Lobster] 22 6.10
FISH PROTEIN CONCENTRATE
FPC's Quality Virtually the Same as Its Raw Material's Quality 21 6.54
The Fish Protein Concentrate Story. 12. ...Protein Enriched Wafers 21 6.54
FISHERY BIOLOGY AND ICHTHYOLOGY
The Distribution of Mesopelagic Fishes in the...North Atlantic Ocean 27 9.12
Winter Distribution of Salmon in Relation to Currents and Water Masses... 27 9.12
Fish of Cold Climes 28 9.10
Lactate Dehydrogenase Isozymes of Pacific Hake... 30 9.12
Scales in Sea 30 9.125
Effects of Salts and pH on Fish Chemoreceptor Responses 37 9.1
FISHERY EDUCATION
Communication in the Physical and the Social Sciences 36 9.7
FISHING CONCERNS AND AGENCIES
Fisheries Service Will Broaden Outlook on Marine Resources 35 9.4
FISHING METHODS
The Behavior of Some Fish Species in a Trawl 11 2.1471
Method of Directing Fish Seining Operations (pat.) 12 2.1475
FOOD TECHNOLOGY
Symposium on Synthetics and Substitutes for the Food Industry 5 0.6
Oilseed Proteins. Present Utilization Patterns 37 0.6
FRESHNESS OF FISH
Separation and Identification of Volatile Amines From Some Marine Animals... 26 7.81
FROZEN FISH, GENERAL
Keeping Time of Frozen Redfish...Fillets... 15 3.240
PRESERVATION, IRRADIATION--Continued
Chronic Animal Feeding Studies on Radiation-Pasteurized Clams... 14 3.15
...Elimination of C. botulinum From...Fishery Products by Irradiation 14 3.15
Radiation Preservation of Fish. III. Carp 14 3.15
Irradiation of Packaged English Sole Fillets 15 3.15
Radiation Preservation of Fishery Products. II. ...Shrimp...and...Squid 15 3.15
Study of Irradiated-Pasteurized Fishery Products 15 3.15
Current Trends in Fish Handling and Processing 16 3.15
General Introduction to Recent Developments in Food Preservation 16 3.15
New Ways of Keeping Fish Fresh 16 3.15
Radiation-Pasteurization of Suddenly Boiled Shrimp 16 3.15
Sterilization 16 3.15
PRESERVATIVES
Fish Preservation (pat.) 13 3.12
Chemical Preservation of Marine Products. VI. ...Combinations of Chemical Preservatives 14 3.11
Biocidal Preservatives for Fish (pat.) 16 3.17
RANCIDITY
Antioxidant Effect of Tocopherols on Autoxidation of Milk Fat...III... 19 4.5
...Rancidity During Short-Time Storage of Cooked Poultry Meat 19 4.5
Studies on TBA-Test I: ...Application to Oxidation Products of Fats... 26 7.879
SAFETY AT SEA
Section of Occupational Medicine 9,11 2.119
Protective Clothing for Fishermen 9 2.119
Articulated Suits: Principles and Design 10 2.119
Protective Clothing for Fishermen: Assessment of Design 10 2.119
Protective Clothing for Fishermen: Design Factors 10 2.119
High Efficiency Personal Protection: Some New Materials and Methods 11 2.119
Protection of Dockyard Workers Against Asbestos 11 2.119
SALMON
...Over-Expansion in the Salmon Fleet. Part One -- Trollers 7 1.3
SANITATION
Disinfection of Fishing Equipment 15 3.18
SHELLFISH AND CRUSTACEANS
The Ocean Quahog...Resource of the Northwestern Atlantic 7 1.82
Florida Scallop Beds Could Solve Industry's Scarcity Problem 8 1.84
Elimination of Bacteria by the Northern Quahaug... 31 9.19
Elimination of Bacteria by the Soft Shell Clam, Mya arenaria 33 9.19
SHRIMP
...Quality Evaluation of Shrimp Held in Refrigerated Brine and Ice 7 1.85
SMOKED FISH
Phenolic Components of Smoked Meat Products 37 3.4
SOUTH AMERICAN FISHERIES
Recent Developments in Peruvian Fisheries 4 1.013
SPOILAGE
...Composition of Shrimp and Other Marine Animals During Processing 12 2.00
TOXICITY
Steroidal Saponin Esters Elaborated by Poisonous Marine Echinoderms 14 2.9
Toxicity of a Xanthid Crab, Zosimus aeneus, and...other Species... 14 2.9
VESSELS, FISHING
Materials for the Sea. Part 5. Ferro-Shotcrete... 9 2.117
Marine Diesel Lubrication 20 2.114
WORLD FISHERIES AND MISCELLANEOUS OCEANIC FISHERIES
The Future of Fishing 5 1.01

Author	Page	Code
Alcaide, Antonio	20	6.32
Alexander, M.	4	0.5
Amano, Keishi	26	7.81
Ampola, V. G.	15	3.15
Arai, Shigeru	30	9.14
Arai, Soichi	21	6.54
--	22	6.54
Arroyo Q., O.	12	2.12
Avery, John (ed.)	2	0.35
Azad, Hardam S.	19	6.34
Backstrom, Jorgen	32	9.19
Backus, Richard H.	27	9.12
Barbier, Michael	20	6.32
Barona M., O.	12	2.12
Ben-Tuvia, A.	12	2.12
Ben-Tuvia, Adam	11	2.12
Berge, Leidolv	30	9.16
Bitman, Joel	1	0.35
Bolton, C. B.	10	2.119
Borchardt, Jack A.	19	6.34
Borowsky, E.	17	4.15
Boyd, Claude E.	25	8.0
Boyd, Eldon M.	1	0.35
Bromley, James E. (pat.)	31	9.17
Brown, N. L.	21	6.54
Cabelli, Victor J.	31	9.19
--	33	9.19
Campbell, Blake A.	7	1.3
Casey, William P.	14	3.2383
Cecil, Helene C.	1	0.35
Charlon, Nichole	27	9.13
Cherry, R. D.	1	0.39
Choe, Sang	15	3.15
Chung, Jong Rak	15	3.15
Chung, Tai Wha	15	3.15
Clark, G. H.	20	2.114
Codlin, E. M.	6	0.8
Coffey, Burton T.	35	9.4
Constable, Christopher R.	10	2.119
Craddock James E.	27	9.12
Crockford, G. W.	10	2.119
Croft, A. J.	5	0.8
Dahan, M. (pat.)	20	6.54
Dandy, J. W. T.	29	9.13
Danilova, E. N.	18	3.23
Decareau, Robert V.	16	3.15
Desai, P. R.	27	8.51
Dragovich, Alexander	29	9.14
Dressman, Ronald C.	31	9.19
Dubrow, D. L.	21	6.54
Dunn, P.	9	2.1111
Edmonds, Russell S.	14	3.15
Ehlermann, D.	13	3.15
--	14	3.15
Eichelberger, James W.	31	9.19
Fegley, Harry C.	14	3.15
Ferguson, Denzel E.	32	9.19
Fish, Marie Poland	30	9.125
Focht, D. D.	4	0.5
French, Robert R.	27	9.12
Friess, Seymour L.	14	2.9
Froud, G. C.	36	9.19
Fujimaki, Masao	21	6.54
--	22	6.54
Fukumi, Toru	24	6.54
Garvey, William D.	36	9.7
Goepfert, J. M.	3	0.5
Gold, E. R.	3	0.39
Goldberg, Edward D.	31	9.19
Gonda, Makoto	21	6.54
--	22	6.54
Gonthier, Beatrice (pat.)	16	3.17
Grayson, Wilbur Charles (pat.)	12	2.1475
Grundman, Frank G.	14	3.2383
Gunstone, F. D. (ed.)	18	4.0
Haedrich, Richard L.	27	9.12
Hansen, David J.	33	9.19
Harada, Katsuhiko	26	7.81
Hardy, E.	8	2.3
Harmon, S. M.	3	0.5
Harries, P. G.	11	2.119
Harrison, H. L.	33	9.19
Harriss, Robert C.	34	9.19
Hashimoto, Yoshiro	14	2.9
--	30	9.14
Hastein, Tore	15	3.18
Hayakawa, Kan-ichi	18	3.337
Heck, Howard F. (pat.)	12	2.3
Heffernan, W. Paul	31	9.19
--	33	9.19
Hicks, R.	3	0.5
Hidaka, I.	37	9.1
Hidiroglou, M.	17	4.15
Higginson, John	4	0.4
Hobbs, G.	14	3.15
Hodgins, H. O.	30	9.12
Holden, A. V.	35	9.19
Holston, J. A.	15	3.15
Hosoda, Kiichi	19	6.32
Houwing, H.	13	3.15
Howard, T. E.	36	9.19
Hsu, Huan-wen	16	3.15
Hudnall, James	37	2.06
Hwang, Yin-si	16	3.15
Idler, D. R.	15	3.240
Ingram, M.	16	3.15
Issenberg, Phillip	37	3.4
Jacobson, Marion	19	4.5
Jenkins, K. J.	17	4.15
Jernelov, Arne	34	9.19
Johnson, Donald W.	34	9.19
Kalb, G. William	24	7.42
Kalinina, N. N.	18	3.23
Kamimoto, Yasutsugu	26	7.81
Kanna, Koichi	23	7.51
Kanno, Chouemon	19	4.5
Kapoor, Inder P.	35	9.19
Kato, Hiromichi	21	6.54
--	22	6.54
Kautter, D. A.	3	0.5
Kawai, Akira	27	9.13
Khalap, S.	3	0.39
Kifer, Robert R.	23	7.51
King, F. J.	15	3.15
Kizawa, Masayuki	23	6.54
Klein, David H.	31	9.19
Koehler, Helen H.	19	4.5
Koizumi, Chiaki	23	6.81
Konosu, Shoji	14	2.9
Korobkina, G. S.	18	3.23
Korotkov, V. K.	11	2.1471
Kramlová, M.	24	7.51
Kropach, C.	30	9.15
Krupa, Vincent	1	0.35
Kwak, Hi-sang	15	3.15
Lachance, L.	9	2.117
Lachman, Robert I.	5	0.8
Lander, Robert H.	4	1.013
Lapeyre, James M.	12	2.3
Lauder, J. T.	15	3.240
Lawrie, A. H.	7	1.0118
Lessard, J. R.	17	4.15
Levander, O. A.	25	8.42
Levin, E. (pat.)	13	3.12
Lew, Sam	34	9.19
Lewis, Owen A. M.	25	7.523
Lichtenberg, James J.	31	9.19
Liljemark, A.	17	3.2495
Lin, Nan	36	9.7
Lincer, Jeffrey L.	33	9.19
Lindsey, C. C. (ed.)	28	9.10
Lisk, Donald J.	26	7.9
Loftas, Tony	29	9.15
Longbottom, James E.	31	9.19
Loucks, O. L.	33	9.19
Love, R. M.	25	7.89
Lustre, Alicia O.	37	3.4
MacCallum, W. A.	15	3.240
MacFarlane, Robert B.	34	9.19
Magueur, A. M.	20	6.32
Mann, M. E.	3	0.5
Marcuse, R.	26	7.879
Martinek, Robert G.	23	7.51
Marx, Leo	34	9.19
Matsuyama, Jun	21	6.54
--	22	6.54
McAlister, W. Bruce	27	9.12
McRae, Ernest D., Jr.	7	1.82
Metcalf, Robert L.	35	9.19
Miller, David	23	7.51
Miller, H., Jr.	21	6.54
Mitchell, J. W.	33	9.19
Miyake, Masato	23	6.54
Miyauchi, David	13	2.3
Mocotte, Jacques (pat.)	16	3.17
Monteiro, Raimundo Porto	22	6.10
Montgomery, W. A.	16	3.15
Moorjani, M. N.	21	6.54
Mora L., O.	12	2.12
Morris, V. C.	25	8.42
Mowbray, William H.	30	9.125
Muenzer, R.	13	3.15
--	14	3.15
Muslemuddin, M.	25	7.89
Nakamura, Masayoshi	24	6.54
Naqvi, Syed M.	32	9.19
Nash, Darrel A.	35	9.2
Nelson, Carnot E.	36	9.7
Newhouse, Muriel L.	9	2.119
Noguchi, Tamao	14	2.9
Nonaka, Junsaku	23	6.81
Noronha, Maria da Conceição C.	22	6.10
Nose, Takeshi	30	9.14
Nystrom, Robert J.	35	9.19
Okada, Minoru	23	7.51
Oldfield, D.	9	2.1111
Osada, Hiromitsu	17	3.330
Osis, Dace	20	6.54
Otsuka, Shigeru	17	3.330
Pariser, E. R.	21	6.54
Parker, Phillip S.	7	1.82
Parkhurst, D. F.	33	9.19
Peakall, David B.	33	9.19
Pedraja, Rafael R.	12	2.00
Potier, P.	20	6.32
Přistoupil, T. I.	24	7.51
Pullen, Edward J.	8	1.86
Ricketson, Barrie (rev.)	5	0.8
Ríos, Campo E.	11	2.12
Rojas G., Hugo F.	16	3.33
--	18	3.336
Rojas García, Hugo F.	7	1.85
Ronsivalli, L. J.	15	3.15
Rubinoff, I.	30	9.15
Rydalv, Marianne	32	9.19
Sachdev, Sham L.	24	7.42
Sakaguchi, Morihiko	27	9.13
Samachson, Joseph	20	6.54
Sangha, Gurcharan K.	35	9.19
Sato, Yasushi	1	0.31
Schwabe, P. H.	11	2.119
Sera, Hiroshi	2	0.38
Sexauer, Richard F. (pat.)	10	2.1128
Shanley, Brigid M. G.	25	7.523
Shannon, L. V.	1	0.39
Sharp, Kenneth H. (pat.)	22	6.54
Shay, M. M.	1	0.39
Shcherbina, M. A.	29	9.14
Shimma, Hisako	28	8.53
Shimma, Yaichiro	28	8.53
Shores, David L.	27	9.12
Sidhu, G. S.	16	3.15
Simmons, John Everette	26	8.51
Smith, Stanford H.	8	1.0118
Spencer, Herta	20	6.54
Springer, C. F.	27	8.51
Squires, H. J.	12	2.12
Stacewicz, R. H.	9	2.1111
Steinberg, Maynard	13	2.3
Stucky, N. P.	32	9.19
Sun, Chaotung	16	3.15
Takahashi, Takashi	23	6.54
Teboul, H. J. (pat.)	20	6.54
Teste, J.	20	6.32
Tetsumoto, Sogo	14	3.11
Thompson, T. E.	3	0.39
Thorsteinsson, Gudni	9	2.1125
Timmerhaus, K. D. (ed.)	5	0.8
Toledo, R. T.	24	6.54
Tracy, C. R.	33	9.19
Trent, W. Lee	8	1.86
Tsugo, Tomikichi	19	4.5
Utter, Fred M.	30	9.12
Van Mameren, J.	13	3.15
Vieira, Gustavo Hitzschky F.	22	6.10
Vyncke, W.	28	9.13
Walden, C. Craig	36	9.19
Watanabe, Kenji	1	0.31
Waters, Melvin E.	17	3.3344
Watts, D. G.	33	9.19
Weiner, J. S.	9	2.119
West, Jeffery L.	13	2.3
West, Philip W.	24	7.42
Westoo, Gunnel	32	9.19
Wheeler, Alwyne (rev.)	28	9.10
--	30	9.125
White, David B.	34	9.19
Wiatrowski, Emilie	20	6.54
Wickham, Donald A.	12	2.12
Wilding, M. D.	37	0.6
Wilkinson, S. G.	4	0.5
Wilson, Alfred J., Jr.	33	9.19
Woods, C. S. (ed.)	28	9.10
Yamada, Kinjiro	26	7.81
Yamashita, Michiko	21	6.54
--	22	6.54
Yamauchi, Kunio	19	4.5
Yannacone, V. J., Jr.	33	9.19
Yoshida, Yoichi	2	0.38

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